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**MASTER OF MILITARY STUDIES**

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**TITLE: AFRICOM'S ROLE IN PROMOTING U.S. ENERGY SECURITY**

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## Executive Summary

**Title:** AFRICOM's Role in Promoting U.S. Energy Security

**Author:** Larry Hosey

**Thesis:** Africa's geopolitical importance to the United States is, like the Middle East, in good measure due to its abundant store of natural resources. Enhancing U.S. energy security should, therefore, include engagement of resource producing African nations through as many sensible means as feasible. To this end, is the newly formed U.S. Africa Command (AFRICOM) a reasonable alternative to policymakers for use in pursuing long-term energy security objectives?

**Discussion:** With a history of colonialism, internecine conflict, weak states, disease, terrorism, and resource exploitation, the African continent contains the ingredients for a volatile geopolitical situation potentially capable of impacting U.S. national security, in particular, U.S. energy security. AFRICOM was created in part to address security issues and to enhance partnership activities. Some critics, moreover, view the creation of AFRICOM as the continuation of the post-9/11 trend to militarize U.S. foreign policy in the conduct of the war against terrorism. Others see the newly formed combatant command as a safeguard against the inevitable collision over natural resources between the United States and China. By 2050, world competition for resources on the relatively under-developed yet resource-rich African continent will reach stressful proportions. Built and propelled by the insatiable industrial and economic appetite for fossil-fuel resources, major energy-consuming nations like China and the United States will have to make hugely consequential decisions regarding the acquisition of those resources, in this case, from Africa. So what must the United States do in this regard to enhance its long-term energy security? Does AFRICOM stand as a reasonable policy tool to further this security goal? This paper will seek to convince readers that despite official U.S. government rhetoric seeking to discredit the idea that AFRICOM has a role in enhancing U.S. energy security, AFRICOM in fact possesses many of the instruments necessary precisely for this purpose.

**Conclusion:** Despite official pronouncements to the contrary, AFRICOM does have the potential to impact the state of U.S. energy security while simultaneously pursuing its stated mandate of military to military training, security enhancement and infrastructure development.

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## Preface

This paper is about the prospects of enhancing long-term U.S. energy security specifically through the use of U.S. Africa Command (AFRICOM). With a history of colonialism, internecine conflict, weak and failed states, disease, poverty, terrorism, and resource exploitation, the African continent contains the ingredients for a volatile geopolitical situation potentially capable of impacting U.S. national and energy security. With this reality as a backdrop, AFRICOM was forged because the existing divisional lines of responsibility among the U.S. combatant commands (COCOM) were inadequate. The simmering debate, however, continues to be whether AFRICOM came into existence in recognition of the virtues of conflict prevention, security and partner capacity building—the theory being that security and good governance are preconditions for development—or as a continuation of the kinetic status quo regarding the war on terror or possibly as a pseudo-militaristic response to the perception that China is gobbling up precious resources. AFRICOM's development in actuality has been a decade-long process pre-dating 11 September 2001.

Within the next century world competition for resources on the relatively under-developed yet resource-rich African continent will reach stressful proportions. Built and propelled by the insatiable industrial and economic appetite for fossil-fuel resources, major energy-consuming nations like the United States will have to make hugely consequential decisions regarding the acquisition of those resources sooner rather than later. It all starts with investing in the creation and sustainment of long-term business and government relationships that seek to address current shortfalls while fostering long-term prospects for a reliable supply of energy resources. The overall importance of Middle East energy to the United States is understood to be substantial and long-lived. But what exactly is the importance of Africa to

the long-term energy security of the United States? More to the point of this paper, do AFRICOM capabilities provide policymakers effective tools to further this security goal?

To begin, literature over the last year has exploded on topics relating to energy and Africa, especially China's government-sponsored energy acquisition efforts on the continent and the resultant impact to U.S. national security and pan-African affairs. Some analysts sound alarm while others seek calculated perspective. Certainly there are many serious problems facing Africa, not least of which is jihadist terrorism which seems to develop mainly in ungoverned areas (e.g. al-Qa'ida in Sudan in the 1990's and al-Qa'ida affiliates in the Maghreb). But up to this point, little has been written on AFRICOM's role in assisting U.S. policymakers with crafting long-term strategies for enhancing energy security.

Publically, AFRICOM officials tout with laudable consistency their mission of helping partner nations achieve peace, security, and good governance through military to military training and humanitarian assistance programs. Their kinetic capability has been conspicuously deemphasized. Prior to AFRICOM's existence, U.S. Department of Defense (DoD) responsibility for Africa was divided among three COCOMs: U.S. Central Command (CENTCOM), U.S. Europe Command (EUCOM) and U.S. Pacific Command (PACOM). With the exception of Egypt, which continues to fall under CENTCOM because of its political and cultural ties to the Middle East, the potentially troublesome seams of Africa within DoD have been largely erased. AFRICOM and its unique mission have significant potential to affect areas along multiple lines of national interest not only for states within Africa but, most importantly, the United States. So the question moving forward should be not why do we have an AFRICOM but how do we inject AFRICOM into the "whole of government" approach toward Africa in general, and U.S. energy security in particular.

Whether the answer is more diplomacy and economic development, less kinetic action, or some other alternative, AFRICOM will not be able to go it alone. Moreover, AFRICOM should be thought of as only one of many instruments available to U.S. policymakers to address the long-term energy security requirements facing the United States. Accordingly, this paper initially will introduce the U.S. national security and defense policies vis-à-vis Africa and U.S. energy security. Within this framework, discussion will turn toward the introduction of AFRICOM as a foreign policy tool ostensibly driven by humanitarian and security assistance mandates. Following discussion of AFRICOM's publically stated role as a conflict prevention mechanism, to include its efforts against terrorism, this thesis will hope to convince readers that despite official pronouncements, AFRICOM also possesses the tools necessary to implement and enhance U.S. energy security. The expectation is that AFRICOM's humanitarian and security assistance efforts will contribute to the strengthening and expansion of governance beyond the current state frontiers resulting in a more secure and stable regional environment. The actual path that our energy future will take may be uncertain but it will most likely involve Africa. The hope is that, in the process of pursuing an energy strategy, AFRICOM's capabilities will enhance U.S. energy security for the long-term.

### **Select Overview of U.S. National Security and Defense Strategies**

The National Defense Strategy (NDS) of June 2008, which flows from the National Security Strategy (NSS) of 2006 and incorporates lessons learned from the 2006 Quadrennial Defense Review, identifies "violent transnational extremist networks, hostile states armed with weapons of mass destruction, rising regional powers, emerging space and cyber threats, natural and pandemic disasters, and competition for resources" as major challenges that the United

States and allies must face.<sup>1</sup> The NDS contains five objectives: defend the homeland, win the Long War, promote security, deter conflict and win our nation's wars.<sup>2</sup>

Africa: The NSS 06 overall pays only nominal attention to the panoply of issues affecting Africa by simply highlighting that the continent contains several regional conflicts which present national security challenges.<sup>3</sup> It also postulates that the strategy to lift Africa out of the doldrums should be to promote economic development and the expansion of effective, democratic governance.<sup>4</sup> The theory is that good governance should beget financial assistance. In the final analysis, there exists a persistent tension in the way that Western institutions (e.g. International Monetary Fund, World Bank, U.S. and European governments) link provision of economic development assistance (bottom up) with employment of effective governance (top down) measures in developing nations such that only limited results have been obtained. To take but one example in Africa, withholding aid from Somalia until it gets its governmental act under control probably means that Somalia will likely not develop economically according to Western wishes and timetables. On the other hand, an example of a non-Western solution with measurably positive results would be China's provision of development assistance in Gabon or Rwanda without interference in internal politics, a survival-based approach to commerce as opposed to the West's value-based approach.<sup>5</sup>

The 2006 NSS places weighty emphasis on the beneficial derivative outcomes of societies that have adopted democracy and the rule of law. For example, it posits that the most effective long-term measure for conflict prevention and resolution is the promotion of democracy.<sup>6</sup> It further asserts that the market economy, the vehicle of economic and political freedom, is the "greatest antidote to poverty."<sup>7</sup> Other factors such as bad governance, geographic and cultural context, history, luck, etc. have just as much to do with relative wealth and, as such, may require alternative solutions. Unsurprisingly, the NDS contains not one



mention of Africa in its stated list of objectives. The Arctic merited one (albeit in relation to Russia).<sup>8</sup> A prime opportunity to focus the defense community on promoting security and deterring conflict in the region by emphasizing the vast array of non-kinetic DoD tools was lost.

Energy Security: The Bush Administration claimed credit in NSS 06 for having “worked with trading partners and energy producers to expand the types and sources of energy, to open markets and strengthen the rule of law, and to foster private investment that can help develop the energy needed to meet global demand.”<sup>9</sup> It identified the need to open, integrate and diversify energy markets to ensure energy independence, yet it characterized world dependence on few suppliers as irresponsible. On this point, global net consumers are simply constrained by geology and historical circumstances of petroleum development. In a likely nod to the importance of Africa, NSS 06 also purports to want to work with resource-rich countries to alleviate the “petroleum curse” by increasing openness, transparency, and the rule of law leading to the promotion of effective democratic governance, foreign direct investment and expansion of the range of energy suppliers.<sup>10</sup> The problem with this familiar theme is that demand for accountability in countries in which the “petroleum curse” may be applicable must be executed by the people of those nations. These people, furthermore, must be willing to engage in civil activities that may potentially upset the balance of power within their country. This is easier said than done because of the level of cooperation required across religious and ethnic boundaries within many African countries. This requirement nevertheless could be abetted initially through smart strategic communications and non-governmental organization (NGO) participation in organizing, for example, grass-roots political and accountability movements.

As with the structural problems facing Africa, the glaring observation to note is that NSS 06 treats positive energy security as a state capable of being reached through the adoption and practice of democratic principles typically developed by the West. Fundamental democratic principles may have a place in developing regions like Africa, but assuming that Western solutions work for African problems will frustrate efforts at making lasting and meaningful change, a sentiment that the NSS 06 responsibly acknowledges but routinely seems to forget. Although not addressing the issue of energy security directly, NDS 08 eloquently describes the future risks, challenges and pressures that will affect the future security environment and how defense policy must account for those areas of uncertainty.<sup>11</sup> Addressed or not, COCOMs have and will continue to partake in operational planning (e.g. Desert Shield/Storm) designed to ensure America's energy security. The goal should always be, however, to exhaust all non-military means prior to engaging combatants in a conflict over energy because the world has reached a state where potentially disastrous effects on a global scale due to the violence and destruction of war have become a virtual certainty. This non-kinetic necessity is exactly what AFRICOM appears to provide.

### **Primer on AFRICOM**

On October 1, 2008, AFRICOM assumed responsibility as a unified COCOM and became the DoD lead for implementing U.S. foreign policy in Africa. Headquartered in Stuttgart, Germany, the new command (the sixth geographic COCOM and the tenth overall) is mission-oriented to contribute to the stability, security, health, and welfare of the regional institutions, nations, and people of Africa. Interagency components include the Department of State (DoS) and U.S. Aid for International Development (USAID). AFRICOM is unique in many ways. First and perhaps most importantly, AFRICOM possesses the 'soft power'

mandate to prevent conflict, a paradigmatic shift in strategic focus from combat operations to combat prevention. Second, it contains interagency personnel in leadership positions throughout the command, most notably a deputy to the commander for civil-military activities who co-supervises U.S. military coordination with other U.S. government agencies working in Africa.<sup>12</sup> Success as AFRICOM is concerned will not be determined in a kinetic sense but will be attained and measured largely in accordance with the degree of success of stability operations and humanitarian assistance.

Lastly, AFRICOM's driving force and core mission is the provision of "persistent and sustained level of effort focused on security assistance programs that prevent conflict in order to contribute to an enhanced level of dialogue and development," the goal being "to enable...partners to marginalize the enemies of peace; minimize the potential for conflict; foster the growth of strong, just governments and legitimate institutions; and support the development of civil societies."<sup>13</sup> The Trans-Sahara Counterterrorism Initiative is one example of AFRICOM's commitment to stamping out the terrorist threat while its participation in the Global Peace Operations Initiative and the Africa Contingency Operations Training Assistance program offers clues to AFRICOM's effectiveness in helping African states improve their security.<sup>14</sup> The trick is to discontinue the policy of "aggregation" in which, through misdirected analyses of issues like poverty, Africa's Muslim population, and ungoverned spaces, localized and disparate insurgencies have been amalgamated into an artificial whole causing a corrosion of African support for well-intentioned U.S. endeavors.<sup>15</sup>

Arrayed against supporters of the official line are skeptics who view AFRICOM as yet another attempt by the United States to militarize a region in the name of national security or perhaps to counter Chinese mercantilist activities and natural resource endeavors. Both camps may have valid points. In fact, both may be right. But in order for AFRICOM to bolster U.S.

national security through security assistance it must be indirectly oriented in the short-term toward energy for this issue in some respect speaks to the core of what ails many African nations: they have what most other nations covet (fossil fuels) yet their various societal fissures prevents them from capitalizing on this natural wealth in a way that has a positive impact on a broader slice of African society. The end result is that in resource rich African nations, wealth and power are concentrated in the strongest minority leaving the rest to cause upheaval in the wake of those seeking to accumulate a portion of that power. According to Carmel Davis in the January 2009 pages of *Orbis*, “[AFRICOM] fosters African security in a way congenial to U.S. interests and serves to counter Chinese influence that would adversely affect the favorable environment the United States seeks to foster.”<sup>16</sup> This may or may not be true regarding China. But with its limited capabilities and combat prevention mission, AFRICOM will require much more than it already has to accomplish its goals and then it still might not be enough for it to overcome its handicap: that it is ostensibly a military organization in a world fatigued with war.

### **Overcoming The Image of Militarization**

Ambassador Edward Marks of the School of Public Policy, Program on Peacekeeping Policy, at George Mason University stated that “security in Africa today is *not* a military problem but a symptom of lack of effective governance.”<sup>17</sup> Headlines from Africa on AFRICOM read with caution: “A Scramble for the Continent We May Not Gain From;” AFRICOM: Wrong for Liberia, Disastrous for Africa.”<sup>18</sup> In July 2008, senior members of the House Subcommittee on National Security and Foreign Affairs expressed annoyance at the U.S. military’s plans to expand its global reach into Africa, asserting that it looked like AFRICOM’s primary mission was to ensure access to Africa’s growing oil production, to

counter China's inroads into the continent for oil, minerals and investment, and to smother terrorism.<sup>19</sup> The preceding examples from an academic, the African media, and U.S. government speak to the confusion over how to view the role of AFRICOM. So how exactly is AFRICOM supposed to engage in development and security without a military face?

The foregoing press descriptions illustrate how image can become the great limiter. Most importantly, image informs perspective and can have either a positive reinforcing effect or an irreconcilably disastrous one, including everything in between. Regardless of the ways in which it came together as a unified command, AFRICOM faced an uphill battle from the start. In other words, no matter how beneficial the U.S. military's humanitarian and security assistance may be with its partners on the African continent, it is still perceived as assistance with a military face. This, in turn, leads to speculation about the true intentions of military assistance. Thus if AFRICOM is perceived as disguising itself as a humanitarian assistance organization, DoD and non-DoD efforts, as beneficial as they might actually be, are likely to suffer a loss of legitimacy and effectiveness.<sup>20</sup> Suffice it to say that the United States, and AFRICOM in particular, will have to do its best to combat its unfavorable image abroad. An example of perception management would be statements like the one from Jerry Lanier, Gen. William E. Ward's foreign policy advisor, who said, "We only go where we are invited and where our presence and what we do reinforces U.S. foreign policy."<sup>21</sup> Unfortunately, skeptics may view such a statement as having multiple meanings. Implicit in the statement, whether intentional or not, is the recognition that energy security will play a role in AFRICOM activities. After all, AFRICOM's creation was centered on the axis uniting humanitarianism and combat prevention with U.S. strategic interests and desired stability of Africa's energy-producing states.<sup>22</sup>

Compounding AFRICOM's image problem are the assertions that China is not only engaged in a policy of "locking up" energy supplies from Africa, but also that China hopes to draw business away from the United States and the European Union as a result of increased economic and political investment. In this light, AFRICOM's appearance on the world stage is viewed as reactionary and protectionist.<sup>23</sup> The downside to this view is that perceptions risk becoming reality for U.S. policymakers who may buy into this rhetoric. A lack of understanding, in turn, will lead to misguided foreign policy and continuation of the trend to militarize and safeguard what were for long periods of time economic sanctuaries for the west. China is doing what nations do: securing energy supplies for its own best interest. It has not been perfect and its activities arguably make the U.S. task of helping Africa more difficult. In the final analysis, however, China is leaving behind pockets of developed infrastructure which at worst may be economically neutral for the U.S. or, if Chinese investments add more to the global aggregate of oil, then Chinese activities may actually benefit America.<sup>24</sup>

Alas, in a continent such as Africa with a history replete with disastrous ethnic, religious and national conflict, the negative perception of yet more U.S. military involvement is perhaps even more acutely part of the pan-African psyche than it might be to Westerners. To many Africans the United States, particularly during the George W. Bush Administration, has militarized foreign policy vis-à-vis Africa. To many Americans, AFRICOM is representative of the recognized need to shift the U.S. military focus from Cold War-era hard power doctrine to the current emphasis on "proactive peacetime engagement" as a way to achieve national security objectives.<sup>25</sup> However one chooses to view AFRICOM's mission, the perception appears to be that more pressure has been placed at the doormat of the nation's defense apparatus to carry out U.S. foreign policy.

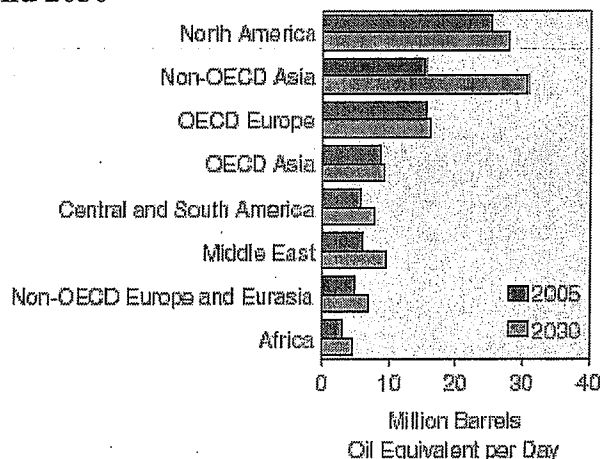
So despite the fact that the DoS has been given the responsibility to “coordinate, lead, and strengthen [U.S. Government] efforts to prepare, plan for and conduct reconstruction and stabilization missions and to harmonize efforts with U.S. military plans and operations,”<sup>26</sup> reality is that at least in Africa, resource-heavy DoD has been handed the reigns of “diplomacy, development and defense” in order to counter the destabilizing problems such as poor governance, corruption, and weak rule of law. Additionally, the independent agency USAID arguably plays the most important part in the tripartite effort with DoD and DoS to tackle development and security assistance primarily because of its ability to bridge the gap between the diplomatic and military giants. That is, USAID’s Pentagon-like operational culture, practical experience gained in Afghanistan and Iraq, willingness to leverage DoD resources to cover its own shortfalls, and lack of concern for preserving its interagency prerogatives will enable it to succeed in an institutional environment without much history of interagency success.<sup>27</sup>

### **Why U.S. Energy Security in Africa Matters--Africa’s Oil and Investment Climate**

Each nation in Africa differs from all others on the continent in its oil future and political history.<sup>28</sup> Exploration across the continent is advancing rapidly in both non-OPEC and OPEC producer and non-producer countries, many considered to have high future production potential (see Appendix A). Approximately 25 African nations have assessed oil and gas potential but lack proven commercial fields. This potential nevertheless feeds the long-term frenzy over Africa’s resource abundance. Governments remain the dominant controlling influence in every phase of Africa’s oil and gas development with possible hope for privatization in the future. The Organization for Economic Cooperation and Development (OECD) estimated that \$1.25 trillion is likely to be invested over the 2001-2030 timeframe,

ahead of Russia and the Middle East. In the period 2011-2020 oil and gas investment will reach around \$130 billion, with upstream outlays for OPEC Africa put around \$50 billion and non-OPEC Africa absorbing at least \$60 billion. With this expected investment, African oil production is expected to grow to over 9 million barrels of oil per day (mbd) in 2010 and to about 12 mbd in 2020.<sup>29</sup> In view of this growing trajectory of oil finance and development activity, little wonder that multinational corporations and governments worldwide are entering the great game. Notable among players is China which has concluded many significant oil and non-oil related deals, particularly in Angola, the Democratic Republic of Congo, and Sudan.<sup>30</sup> Ironically, with such large production potential Africa remains the world's smallest consumer of petroleum (Figure 1).

**Figure 1. World Liquids Consumption by Region and Country Group, 2005 and 2030**



Sources: 2005: Derived from Energy Information Administration (EIA), *International Energy Annual 2005* (June-October 2007), web site [www.eia.doe.gov/iea](http://www.eia.doe.gov/iea). Projections: EIA, *World Energy Projections Plus* (2008).

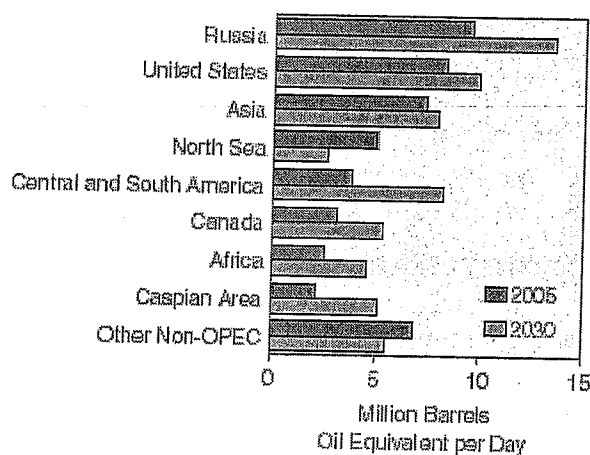
In Africa, almost 70 percent of non-OPEC conventional liquids production comes from four countries: Egypt (28 percent), Equatorial Guinea (16 percent), Sudan (15 percent), and Congo-Brazzaville (10 percent). Together, the four are expected to retain an approximate 70 percent



share of Africa's non-OPEC conventional production through 2030 (Figure 2). The second-fastest growth rate in liquids production among the OPEC countries (behind Qatar) is projected for Angola, averaging 3.7 percent per year from 2005 to 2030.<sup>31</sup> (Figure 3)

West African crude, in particular, is prized for its naturally light and sweet quality. It also sits just off the shore of Western Africa with direct shipping routes to markets in North America and Europe. According to the Energy Information Administration's 2008 Energy Outlook, the United States imported more oil from Africa in 2005 than it did from the Middle East. By 2015, the Gulf of Guinea will provide a quarter of U.S. oil imports.<sup>32</sup> In the last five years, Africa accounted for a quarter of all new oil discovered around the globe.<sup>33</sup>

**Figure 2. Non-OPEC Conventional Liquids Production by Region, 2005 and 2030**

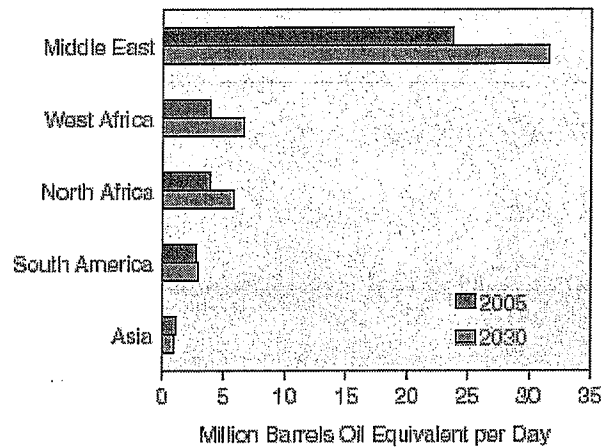


Sources: 2005: Energy Information Administration (EIA), *International Energy Annual 2005* (June-October 2007), web site [www.eia.doe.gov/iea](http://www.eia.doe.gov/iea). 2030: Energy Information Administration, *Generate World Oil Balance Model* (2008).

As of January 1, 2008, proved world oil reserves, as reported by the *Oil & Gas Journal*, were estimated at 1,332 billion barrels (Figure 4), 56 percent of which are located in the Middle East. Among the top 20 reserve holders in 2008, 11 are OPEC member countries that,

together, account for 69 percent of the world's total reserves.<sup>34</sup> On the whole, this means that despite the rosy prospects for Africa's

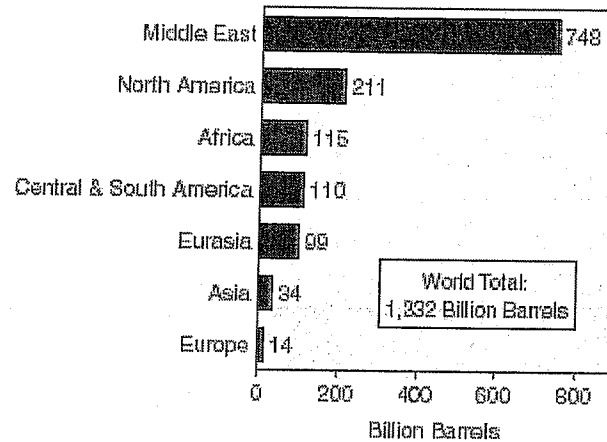
**Figure 3. OPEC Conventional Liquids Production by Region, 2005 and 2030**



Sources: 2005: Energy Information Administration (EIA), *International Energy Annual 2005* (June-October 2007), web site [www.eia.doe.gov/iea](http://www.eia.doe.gov/iea). 2030: Energy Information Administration, *Generate World Oil Balance Model* (2008).

oil and gas development over the next two decades, total output, and hence contribution to global oil and gas supplies, will continue to remain much less in terms of both volume and importance than that of the Middle East. As Appendix A shows for world and regional petroleum production, Africa will play only a minor role as it regards short-term energy security for the U.S. When viewed in this light, China's petroleum activities on the continent should appear much less worrisome to the alarmists who argue that AFRICOM was a response to Chinese activist petroleum policies. But over time as more of Africa's potential is reached, production will comprise a more geostrategic importance, and hence more relevant in terms of energy security.

**Figure 4. World Proved Oil Reserves by Geographic Region as of January 1, 2008**



Source: "Worldwide Look at Reserves and Production," *Oil & Gas Journal*, Vol. 105, No. 48 (December 24, 2007), pp. 24-25.

### China in Africa

Analysis of energy security in Africa would be incomplete without a few words about China. China's current relationship with Africa began with a tour of the continent in 1996 by Jiang Zemin, fresh on the heels of Deng Xiaoping's domestic economic successes. Jiang proposed a platform of reliable friendship, sovereign equality, non-intervention, mutually beneficial development and international cooperation. The actual practice of locking in government-to-government agreements on resources began in 1993, reflective of the instability and uncertain times in the Middle East.

In 1996, China went from being a net exporter to a net importer of oil. African oil accounted for 17% of Chinese oil imports in 1997 and 28.7% by 2004. By 2005, it had overtaken Japan to become the world's second largest importer behind the United States.

Overall, Chinese trade with Africa tripled between 2000 and 2005 to nearly \$50 billion and is expected to hit \$100 billion by 2010. China has started construction on a new railway in Nigeria and a new Gabonese port, paved most of the roads in Rwanda, and is building roads,

bridges, power stations, schools, and cellular phone networks in at least a dozen African nations. At any given time, the China Road and Bridge Corporation is likely to be engaged in nearly 500 projects throughout Africa. All this activity requires a support infrastructure. In Lesotho, for example, nearly half the supermarkets are owned and operated by Chinese. All the while China has been subtly luring African nations to buy into the “one-China” policy resulting in a major decline in the number of African nations that recognize Taiwan as a sovereign entity. On the 50<sup>th</sup> anniversary of the “Spirit of Bandung,” China launched the New Asian African Strategic Partnership (NAASP), a more robust version of the China-African Cooperation Forum (CACF). At the conference, \$5 billion in new loans and credits for Africa were announced, in addition to pledges to train 15,000 African professionals and establishment of a development fund for building schools and hospitals.

China’s strategy with non-OPEC aligned Africa has been to overbid for concessions in oilfields of dubious quality accompanied by large domestic infrastructure improvement projects all “without strings.” For example, Angola awarded China promising offshore acreage and contracts for the purchase of crude from the state oil company Sonangol in exchange for a \$2 billion loan to the Angolan government for new road and airport construction and improvement projects, no questions asked. Unlike Western countries where oil companies operate independently from governments, in China virtually all petroleum exploration is undertaken by state-owned firms which means a direct relationship between Beijing’s foreign policy and the commercial affairs of its oil industry.<sup>35</sup> As the foregoing evidence makes abundantly clear, China does not hesitate to initiate deals and pursue national goals. It is in their rational best interest to do so.

To sum up, China’s role in Africa can be delineated along three traditional yet different lines of thought: 1) China as development partner to African resource-exporting nations, 2)

China as an economic competitor to the West, and 3) China as an economic colonizer of African resource-exporting nations for the purpose of securing energy production and supply chains.<sup>36</sup> All three characterizations to some degree may be right, but they all “oversimplify complicated and overlapping interactions which are themselves nested within the diverse African political and economic landscape.”<sup>37</sup> Regardless, in many ways China is Africa’s most enduring partner and has created the image that it is the new face of globalization and potential development model.<sup>38</sup>

### **Energy Security Options in Africa**

With populations and energy demand constantly increasing amidst the prospect of “peak oil” looming over the extractive industries sometime within this century, the largest concern is whether the United States and other major powers will have secured access to energy supplies while initiating the transition to alternative fuel sources as a supplement to traditional energy needs or perhaps as a substitute for dwindling supplies of existing fossil fuels. Commerce and the quality of life as we currently know it demands the uninterrupted flow of oil. Importantly, nations want to avoid sinking into a dangerous state of declining deterrent ability (because militaries rely on the same energy sources that fuel nations and economies). Consider that the U.S. military is the U.S. Government’s single largest consumer of fossil fuels; as a result, maintaining a first-class military force requires enormous energy expenditures. This last consideration alone seems like a good reason to pursue aggressive long-lasting energy policies related to Africa using tools such as AFRICOM. To have any shot at preventing conflict in Africa, and more importantly preventing troubles originating in Africa

from having an unnecessary impact on the United States while fostering good relations with other energy consumers like China and India, U.S. administrations will need to inject AFRICOM into an holistic approach toward achieving its energy and national security goals.

For the sake of this thesis, two major assumptions must be made prior to positing suggestions for the enhancement of U.S. energy security in the context of Africa. First, U.S. energy dependence on oil will continue at least until mid-century and, most likely, beyond. Second, AFRICOM will stick to its 'soft power' mandate of conflict prevention, security assistance, and bilateral partnership building without being diverted to other military operations of a more kinetic nature such as counterinsurgency. With AFRICOM at the ready, the goal is ultimately to enhance either directly or indirectly U.S. energy through any combination of the following:

- Nurture the OPEC and non-OPEC countries of West and North Africa. Taken together, the oil-exporting countries of these two regions surpass Canada as the number one importer of oil to the U.S. Furthermore, these same two regions are second only to Canada in total petroleum exports to the U.S. (See Appendix B) Angola, in turn, has become China's leading oil provider surpassing Saudi Arabia.<sup>39</sup> Assisting the governments and institutions of these important nations (Angola, Nigeria, Chad, Algeria, Congo-Brazzaville, and Equatorial Guinea) top to bottom with all elements of government, commerce, education and social issues will eventually lead to a relationship predicated on mutually beneficial strategic interests, like that currently shared with Saudi Arabia.
- Increase funding for AFRICOM operations. This might appear too obvious a place to start but according to the U.S. Government Accountability Office, AFRICOM will cost

around \$4 billion between 2010 and 2015. That includes \$2 billion for the 1,800-strong CJTF-HOA in Djibouti. However, in September 2008, the House of Representatives voted to allocate only \$266 million for the first years of operations, \$123 million less than requested by former President George Bush, citing “the failure to establish an American presence on the continent.”<sup>40</sup> To have any chance of making a meaningful impact in Africa, AFRICOM will require more Congressional support and money to engage in the full spectrum of useful activities such as security enhancement in the Niger Delta region, Gulf of Guinea and Angola, engineering requirements, etc. leading to strengthened energy security.

- Improve maritime security in the Gulf of Guinea, Gulf of Aden and the Indian Ocean off the coast of Somalia.<sup>41</sup> Crimes of the high seas and piracy have no place in the 21<sup>st</sup> century. Piracy, like hijackings and terrorism, has a disproportionate effect on regional and global commercial trading routes and media coverage which currently plays into the hands of the pirates themselves. To do this AFRICOM must be given the resources to beef up its maritime presence with the goal of rendering not only the piratical scourge but also the sea-faring anti-government criminals in the Gulf of Guinea impotent. Employing additional U.S. maritime assets including the U.S. Coast Guard, as well as selling patrol vessels to African nations in need over and above current levels, will go some way in plugging the huge gap in offshore security. To this end, a significant opportunity to strike maritime security assistance agreements will enable efforts at enhancing good government, the lack of which can be said to contribute to things such as piracy.

- Assist African nations, especially West Africa, with more robust counter-drug capabilities and operations. Drug culture undermines rule of law. Rule of law is

needed for good governance and development. Good governance means better energy security for Africa and America. The United Nations Office on Drugs and Crime estimates at least 50 tons of cocaine transits through West Africa annually. The narcotics trade is on the rise. AFRICOM is supporting Ghanaian counter-drug programs, for example, by funding drug screening equipment at the country's international airport and funding a police facility to aid in the storage and processing of evidence related to drug cases.<sup>42</sup> Even though this might be part of a larger U.S. program aimed at stemming the drug trade, it is far too little to have any meaningful impact. More is needed in terms of technical and human capabilities to help combat the growing West African drug trade.

- Beef up AFRICOM's interagency presence and level of expertise on African issues in order to give more substance to the U.S. engagement with Africa. Although Ambassador Marks rightly indicates that "adding a few civilian officials to a military command will not meaningfully change the military character of the organization,"<sup>43</sup> it is extraordinarily important that AFRICOM be given the chance to alter world opinion of U.S. military intentions and African concerns that AFRICOM is simply another neocolonialist outfit dressed in sheep's clothing. A more understanding COCOM might lead to a better operating environment which could then grease commercial energy transactions leading to energy diversification.
- Expand membership in the Joint Interagency Coordination Group (JICG) affiliated with AFRICOM to private sector captains of energy industry with stakes in Africa, including senior representation from the Department of Energy. Our nation's commercial, humanitarian and non-conflict military endeavors in Africa must be consonant with our government's desired long-term outlay if coherence and success is to be achieved.



Ideally, JICG's should be led by a senior DoS regional representative charged with carrying out U.S. foreign policy in the region.

- Support Chinese development efforts. As counterintuitive as this might seem, China is pouring in valuable money and resources to an underdeveloped continent. Every dollar they pour in is one less provided by the United States.
- In non-disaster situations, cease direct humanitarian aid payments to the recipient governments. Instead, create a finance regime which would disburse funds to vetted humanitarian aid organizations subject to strict accountability standards as a condition of receiving additional aid.

## **Conclusion**

All told, the United States currently gets nearly one quarter of its oil from West Africa alone.<sup>44</sup> So it stands to reason that promises of military assistance, especially in the combat sense, are not the type of long-term commitment we need to make to Africa. In the long-run, conflict helps neither them nor us. Neither should we feel our energy future threatened by Chinese tactics in the oil fields of Africa. To be sure, the existence of AFRICOM will prove tempting for policymakers in terms of protecting the extractive industries, especially those of U.S. origin, from marauding criminals and a mercantilist China. But AFRICOM is capable of more than that despite having such few troops. To reiterate, Africa and China present no compelling case or threat to U.S. vital interests that should cause the U.S. government to expand its kinetic military capabilities in the region. AFRICOM's strength is in its mission to prevent conflict and enhance security and peace. Even better, as a Center for Strategic and International Studies 2008 report on nontraditional security assistance noted, AFRICOM would

be even stronger if it adopted a civilian-led approach to and oversight of U.S. foreign policy toward the region.<sup>45</sup>

Unfortunately, AFRICOM will create a strong legislative impulse to act for U.S. policymakers in cases where deleterious events in Africa create a strong emotional response toward the perpetrators. Of course, in classic insurgency fashion, that is what the criminals want. Therefore, our national security elite must understand the complexities and fabric of Africa and the limitations of AFRICOM. Administrations and legislators must also factor in the strength of all the other non-military instruments of power that are capable of effecting meaningful change without tarnishing our image or exacerbating the global security situation for the last things we want to do are 1) commit American troops reflexively to regional conflicts unsolvable by outside forces and incongruent with U.S. national security interests; 2) implement policies that serve to antagonize or undermine the goals of foreign nations such as China in terms of energy diversification and economic development, and 3) lack of full appreciation for the benefits of broader U.S. government and international efforts to develop the institutional and economic fronts even when they may conflict in the short-term with efforts to achieve security development.

To avoid undermining America's long-term energy security the U.S. national security apparatus should revisit with a skeptical eye the traditional model of partnership conditionally based on security assistance and good governance. Without significant injection of economic capital and infrastructure improvements, like the Chinese have provided for instance, the model is bound to take so long to produce results as to appear to fail. Worse, it may never work at all. In essence, we must show restraint, not police; engagement, not unilateral military action.

## Endnotes

- <sup>1</sup> "National Defense Strategy," U.S. Department of Defense, June 2008. Hereafter referred to as NDS 08.
- <sup>2</sup> NDS 08, 10.
- <sup>3</sup> Ibid., 15.
- <sup>4</sup> Ibid., 37.
- <sup>5</sup> John Ghazvinian, *Untapped: The Scramble for Africa's Oil*, (New York: Harcourt, 2007), 288.
- <sup>6</sup> "National Security Strategy, 2006," Office of the President of the United States, 15. Hereafter referred to as NSS 06.
- <sup>7</sup> Ibid., 25.
- <sup>8</sup> NDS 08, 4.
- <sup>9</sup> NSS 06, 25.
- <sup>10</sup> Ibid., 28-29.
- <sup>11</sup> NDS 08, 5.
- <sup>12</sup> Robert T. Moeller and Mary C. Yates, "The Road to a New Unified Command" *Joint Forces Quarterly* 51, 4<sup>th</sup> quarter 2008: 67-73.
- <sup>13</sup> William E. Ward and Thomas P. Galvin, "U.S. Africa Command and the Principle of Active Security," *Joint Forces Quarterly* 51, 4<sup>th</sup> quarter 2008: 61-66.
- <sup>14</sup> Sean McFate, "US Africa Command: Next Step or Next Stumble," *Africa Affairs* 107, no. 426 (January 2008): 112-113, <http://www.proquest.com/>.
- <sup>15</sup> Robert G. Berschinski, "AFRICOM's Dilemma: The 'Global War on Terrorism,' 'Capacity Building,' Humanitarianism, and the Future of U.S. Security Policy in Africa (Carlisle, PA: Strategic Studies Institute, U.S. Army War College, 2007), 2, <http://www.StrategicStudiesInstitute.mil> (accessed February 23, 2009).
- <sup>16</sup> Carmel Davis, "AFRICOM's Relationship to Oil, Terrorism and China," *Orbis* 53, no. 1 (Winter 2009): 123.
- <sup>17</sup> Edward Marks, "Why USAFRICOM?," *Joint Forces Quarterly*, no. 52 (1<sup>st</sup> quarter 2009): 148-151.
- <sup>18</sup> Fred Mbugua, "A scramble for the Continent We May Not Gain From," *The East African Standard*, March 27, 2007; Ezekiel Pajibo and Emira Woods, "AFRICOM: Wrong for Liberia, Disastrous for Africa," *Foreign Policy in Focus*, July 26, 2007, as quoted in Berschinski, 7.
- <sup>19</sup> Ed Blanche, "AFRICOM's Agenda Still Baffles Africa," *New African*, no. 481 (February 2009): 46-47.
- <sup>20</sup> Berschinski, 2.
- <sup>21</sup> Kenneth Fidler, "AFRICOM Commander Pledges Support to African Nations," *American Forces Press Service*, January 23, 2009, <http://www.proquest.com/>.
- <sup>22</sup> Berschinski, 5.
- <sup>23</sup> For example, see Jennifer L. Parenti, "China-Africa Relation in the 21<sup>st</sup> Century," *Joint Forces Quarterly*, no. 52 (1<sup>st</sup> quarter 2009): 119.
- <sup>24</sup> Eugene Gholz and Daryl G. Press, "Energy Alarmism: The Myths That Make Americans Worry About Oil." April 5, 2007. [http://www.cato.org/pub\\_display.php?pub\\_id=8161](http://www.cato.org/pub_display.php?pub_id=8161) (accessed April 27, 2009). For a discussion on the negative consequences of Chinese aid to Africa see, for example, Joshua Kurlantzick, *Charm Offensive* (New Haven: Yale University Press, 2008), 172-175.
- <sup>25</sup> Dennis R.J. Penn, "USAFRICOM: The Militarization of U.S. Foreign Policy?" *Joint Forces Quarterly*, no. 51 (4<sup>th</sup> quarter 2008): 74-78.
- <sup>26</sup> Joint Publication 3-08, Interagency, Intergovernmental Organization, and Nongovernmental Organization Coordination during Joint Operations, volume I (Washington, DC: The Joint Staff, March 17, 2006), viii.
- <sup>27</sup> Center for Strategic and International Studies (CSIS), "Integrating 21<sup>st</sup> Century Development and Security Assistance." January 2008, 29.
- <sup>28</sup> Duncan Clarke, *Crude Continent: The Struggle for Africa's Oil Prize* (London: Profile Books, 2008), 80.
- <sup>29</sup> Ibid., 383-387.
- <sup>30</sup> Ibid., 389.
- <sup>31</sup> Energy Information Administration, "International Energy Outlook 2008," (Washington, DC: Department of Energy, 2008), 2, [http://www.eia.doe.gov/oiaf/ieo/pdf/0484\(2008\).pdf](http://www.eia.doe.gov/oiaf/ieo/pdf/0484(2008).pdf) (accessed January 1, 2009); hereafter referred to as IEO 2008.
- <sup>32</sup> Nicholas Shaxson, *Poisoned Wells: The Dirty Politics of African Oil* (New York: Palgrave MacMillan, 2007), 2-3, quoted from IEO 2008.

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<sup>33</sup> See, for example, "Africa Growing in Importance to World Energy Market," April 2006, <http://energy.ihs.com/NR/rdonlyres/DB4721FE-02FA-4D1D-BA74-0B8DB1DE7464/0/worldwatch0406.pdf>, quoted in Shaxon, 3.

<sup>34</sup> IEO 2008, 30.

<sup>35</sup> Ghazvinian, 275-279.

<sup>36</sup> For excellent definitions of each, see Chris Alden, *China in Africa*, African Arguments (London: Zed Books, 2007), 5.

<sup>37</sup> Ibid., 125.

<sup>38</sup> Ibid., 128-129.

<sup>39</sup> [www.eia.gov](http://www.eia.gov).....(accessed 26 April 2009).

<sup>40</sup> Blanche, 46-47.

<sup>41</sup> Ibid.

<sup>42</sup> Info-Prod Research (Middle East), "West African Drug Trade Concerns U.S. Officials," *Ramat-Gan*, March 4, 2009. <http://www.proquest.com/>.

<sup>43</sup> Marks, 149.

<sup>44</sup> Blanche, 46-47.

<sup>45</sup> CSIS, "Integrating 21<sup>st</sup> Century Development and Security Assistance," 28.

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## Appendix A

Projection of Liquid Fuels and Other Petroleum Production in Five Cases:

- Reference
- High Price
- Low Price
- High Economic Growth
- Low Economic Growth

**Table A1. World Total Liquids Production by Region and Country, Reference Case, 1990-2030.**  
(Million Barrels Oil Equivalent per Day)

Region/Country	History (Estimates)			Projections					Average Annual Percent Change, 2005-2030
	1990	2005	2006	2010	2015	2020	2025	2030	
OPEC <sup>a</sup>	25.2	36.1	35.8	37.4	40.9	44.4	46.7	49.3	1.3
Asia (Indonesia)	1.5	1.1	1.1	0.9	0.9	0.9	1.0	1.0	-0.7
Middle East	16.1	23.8	23.6	23.7	26.2	28.8	30.2	31.8	1.2
Iran	3.1	4.2	4.1	4.1	4.0	4.0	4.2	4.5	0.2
Iraq	2.1	1.9	2.0	2.0	2.2	3.4	3.8	4.0	3.1
Kuwait	1.2	2.7	2.7	2.6	2.9	3.0	3.1	3.3	0.9
Qatar	0.4	1.1	1.1	1.6	2.2	2.7	2.9	3.2	4.3
Saudi Arabia	7.0	11.1	10.7	10.5	11.9	12.6	13.1	13.7	0.8
United Arab Emirates	2.3	2.8	2.9	2.9	2.9	3.0	3.1	3.1	0.3
North Africa	2.7	3.8	3.9	4.7	5.0	5.1	5.4	5.8	1.7
Algeria	1.3	2.1	2.1	2.7	3.1	3.4	3.6	4.0	2.6
Libya	1.4	1.7	1.8	2.0	1.8	1.8	1.7	1.7	0.1
West Africa	2.3	3.9	3.9	5.1	5.7	5.9	6.2	6.7	2.2
Angola	0.5	1.3	1.4	2.5	2.7	2.8	2.9	3.1	3.7
Nigeria	1.8	2.6	2.4	2.6	3.1	3.1	3.3	3.5	1.2
South America	2.5	3.4	3.3	3.0	3.1	3.6	3.9	4.1	0.8
Ecuador	0.3	0.5	0.5	0.4	0.5	0.5	0.5	0.6	0.5
Venezuela	2.3	2.9	2.8	2.5	2.6	3.1	3.4	3.5	0.9
Non-OPEC	41.1	48.2	48.4	51.8	54.7	57.0	59.8	63.2	1.1
OECD	20.0	21.8	21.4	21.5	21.7	21.5	22.0	22.3	0.1
OECD North America	14.7	15.1	15.2	16.2	17.0	17.2	17.7	18.0	0.7
United States	9.7	8.2	8.2	9.4	9.9	10.2	10.2	9.8	0.7
Canada	2.0	3.1	3.3	3.8	4.4	4.6	5.0	5.3	2.2
Mexico	3.0	3.8	3.7	3.0	2.7	2.4	2.6	2.8	-1.1
OECD Europe	4.5	5.9	5.5	4.5	3.9	3.5	3.4	3.4	-2.1
OECD Asia	0.8	0.7	0.7	0.8	0.8	0.8	0.9	0.9	0.8
Japan	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	1.4
South Korea	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	5.8
Australia and New Zealand	0.7	0.6	0.6	0.6	0.6	0.6	0.6	0.7	0.4
Non-OECD	21.1	26.5	27.0	30.3	33.1	35.5	37.8	40.9	1.8
Non-OECD Europe and Eurasia	11.6	11.9	12.3	14.0	15.9	16.8	17.5	18.9	1.8
Russia	10.1	9.5	9.7	10.2	11.4	12.1	12.6	13.5	1.4
Caspian Area	1.1	2.1	2.3	3.5	4.2	4.5	4.7	5.1	3.6
Other	0.4	0.3	0.3	0.3	0.2	0.2	0.2	0.3	-0.9
Non-OECD Asia	4.4	6.5	6.5	6.9	7.1	7.4	7.6	7.7	0.7
China	2.8	3.7	3.8	3.8	3.9	4.0	4.0	4.1	0.4
India	0.7	0.8	0.8	1.1	1.1	1.2	1.4	1.3	1.8
Other	1.0	1.9	1.9	2.0	2.1	2.2	2.2	2.3	0.7
Middle East (Non-OPEC)	1.3	1.7	1.6	1.5	1.5	1.5	1.6	1.6	-0.2
Africa	1.7	2.6	2.6	3.0	3.3	3.7	4.1	4.5	2.3
Central and South America	2.1	3.8	3.9	4.9	5.2	6.0	7.0	8.2	3.1
Brazil	0.8	1.9	2.1	3.2	3.6	4.3	5.0	5.7	4.4
Other	1.3	1.8	1.9	1.7	1.6	1.7	2.0	2.5	1.2
Total World	66.3	84.9	84.2	89.2	95.7	101.3	106.5	112.5	1.2
OPEC Share of World Production	38%	43%	43%	42%	43%	44%	44%	44%	
Persian Gulf Share of World Production	24%	28%	28%	27%	27%	28%	28%	28%	

<sup>a</sup>OPEC = Organization of the Petroleum Exporting Countries (OPEC-13).

Sources: History: Energy Information Administration (EIA), Office of Energy Markets and End Use. Projections: EIA, Generate World Oil Balance Model (2008).

**Table A2. World Conventional Liquids Production by Region and Country, Reference Case, 1990-2030. (Million Barrels Oil Equivalent per Day)**

Region/Country	History (Estimates)			Projections					Average Annual Percent Change, 2005-2030
	1990	2005	2006	2010	2015	2020	2025	2030	
OPEC <sup>a</sup>	25.2	35.3	35.1	36.5	39.8	43.0	45.3	47.7	1.2
Asia (Indonesia)	1.5	1.1	1.1	0.9	0.9	0.9	0.9	0.9	-0.9
Middle East	16.1	23.8	23.5	23.7	26.0	28.6	30.0	31.5	1.1
Iran	3.1	4.2	4.1	4.1	4.0	4.0	4.2	4.5	0.2
Iraq	2.1	1.9	2.0	2.0	2.2	3.4	3.8	4.0	3.1
Kuwait	1.2	2.7	2.7	2.6	2.9	3.0	3.1	3.3	0.9
Qatar	0.4	1.1	1.1	1.6	2.0	2.5	2.7	3.0	4.0
Saudi Arabia	7.0	11.0	10.6	10.5	11.9	12.6	13.1	13.7	0.9
United Arab Emirates	2.3	2.8	2.9	2.9	2.9	3.0	3.1	3.1	0.3
North Africa	2.7	3.8	3.9	4.7	5.0	5.1	5.4	5.8	1.7
Algeria	1.3	2.1	2.1	2.7	3.1	3.4	3.6	4.0	2.6
Libya	1.4	1.7	1.8	2.0	1.8	1.8	1.7	1.7	0.1
West Africa	2.3	3.9	3.9	5.1	5.7	5.9	6.2	6.7	2.2
Angola	0.5	1.3	1.4	2.6	2.7	2.8	2.9	3.1	3.7
Nigeria	1.8	2.6	2.4	2.6	3.0	3.1	3.3	3.5	1.2
South America	2.5	2.7	2.7	2.1	2.2	2.5	2.6	2.9	0.2
Ecuador	0.3	0.5	0.5	0.4	0.5	0.5	0.5	0.6	0.5
Venezuela	2.3	2.2	2.1	1.7	1.7	2.0	2.2	2.3	0.1
Non-OPEC	40.5	46.5	46.5	48.2	49.6	50.9	52.5	55.1	0.7
OECD	19.5	20.3	19.8	18.8	17.7	16.8	16.4	16.2	-0.9
OECD North America	14.3	13.7	13.6	13.6	13.2	12.6	12.3	12.1	-0.5
United States	9.6	7.9	7.8	8.7	8.9	8.9	8.6	8.2	0.1
Canada	1.7	2.0	2.1	1.9	1.6	1.3	1.2	1.1	-2.3
Mexico	3.0	3.8	3.7	3.0	2.7	2.4	2.5	2.8	-1.2
OECD Europe	4.5	5.9	5.5	4.5	3.8	3.4	3.3	3.3	-2.3
Denmark	0.1	0.4	0.3	0.3	0.2	0.2	0.1	0.1	-5.1
Norway	1.7	3.0	2.8	2.4	2.0	1.7	1.7	1.6	-2.4
United Kingdom	2.0	1.9	1.7	1.2	1.0	0.8	0.8	0.8	-3.1
Other	0.7	0.7	0.7	0.6	0.7	0.7	0.7	0.8	0.6
OECD Asia	0.8	0.7	0.7	0.7	0.8	0.8	0.8	0.9	0.6
Japan	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	1.4
South Korea	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.9
Australia and New Zealand	0.7	0.6	0.6	0.6	0.6	0.6	0.6	0.7	0.4

<sup>a</sup>OPEC = Organization of the Petroleum Exporting Countries (OPEC-13).

(Continued)

Table A2. World Conventional Liquids Production by Region and Country, Reference Case, 1990-2030. (Million Barrels Oil Equivalent per Day)

Region/Country	History (Estimates)			Projections					Average Annual Percent Change, 2005-2030
	1990	2005	2006	2010	2015	2020	2025	2030	
Non-OECD .....	21.0	26.2	26.7	29.4	31.9	34.1	36.1	38.9	1.6
Non-OECD Europe and Eurasia .....	11.6	11.9	12.3	14.0	15.9	16.8	17.5	18.9	1.8
Russia .....	10.1	9.5	9.7	10.2	11.4	12.1	12.6	13.5	1.4
Caspian Area .....	1.1	2.1	2.3	3.5	4.2	4.5	4.7	5.1	3.6
Azerbaijan .....	0.3	0.4	0.6	1.3	1.3	1.2	1.1	1.0	3.5
Kazakhstan .....	0.6	1.3	1.4	1.9	2.6	2.9	3.1	3.6	4.0
Turkmenistan .....	0.1	0.2	0.2	0.2	0.3	0.3	0.3	0.4	2.5
Uzbekistan .....	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	-1.2
Other .....	0.4	0.3	0.3	0.3	0.2	0.2	0.2	0.3	-1.0
Non-OECD Asia .....	4.4	6.5	6.6	6.6	6.8	7.1	7.1	7.0	0.3
China .....	2.8	3.8	3.8	3.7	3.7	3.8	3.7	3.8	0.0
India .....	0.7	0.8	0.9	1.0	1.0	1.1	1.2	1.1	1.1
Brunei .....	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.2	0.6
Malaysia .....	0.6	0.7	0.7	0.6	0.6	0.7	0.7	0.7	0.0
Thailand .....	0.1	0.3	0.3	0.4	0.4	0.4	0.4	0.4	1.4
Vietnam .....	0.1	0.4	0.4	0.5	0.5	0.5	0.5	0.5	1.1
Other .....	0.1	0.3	0.3	0.3	0.3	0.3	0.2	0.2	-0.5
Middle East (Non-OPEC) .....	1.3	1.7	1.6	1.5	1.5	1.5	1.6	1.6	-0.2
Oman .....	0.7	0.8	0.7	0.7	0.8	0.8	0.8	0.9	0.4
Syria .....	0.4	0.5	0.4	0.4	0.4	0.4	0.3	0.3	-1.5
Yemen .....	0.2	0.4	0.4	0.3	0.3	0.3	0.4	0.4	-0.1
Other .....	0.0	0.1	0.1	0.0	0.0	0.0	0.1	0.1	0.0
Africa .....	1.6	2.4	2.4	2.8	2.9	3.3	3.6	4.0	2.0
Chad .....	0.0	0.2	0.2	0.2	0.2	0.2	0.3	0.4	2.8
Congo (Brazzaville) .....	0.2	0.2	0.2	0.2	0.3	0.4	0.5	0.6	3.7
Egypt .....	0.9	0.7	0.7	0.6	0.6	0.7	0.8	0.8	0.4
Equatorial Guinea .....	0.0	0.4	0.4	0.5	0.4	0.4	0.5	0.4	0.5
Gabon .....	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.3	0.0
Sao Tome and Principe .....	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	—
Sudan .....	0.0	0.4	0.4	0.7	0.7	0.7	0.8	0.9	4.0
Other .....	0.3	0.3	0.4	0.4	0.4	0.5	0.5	0.6	2.7
Central and South America .....	2.0	3.6	3.7	4.6	4.6	5.4	6.3	7.3	2.9
Brazil .....	0.7	1.8	1.9	2.9	3.2	3.7	4.3	5.0	4.2
Argentina .....	0.5	0.8	0.8	0.7	0.5	0.4	0.4	0.4	-2.7
Colombia .....	0.5	0.5	0.5	0.4	0.4	0.3	0.3	0.3	-2.4
Peru .....	0.1	0.1	0.1	0.1	0.2	0.2	0.3	0.4	4.8
Trinidad and Tobago .....	0.1	0.2	0.2	0.2	0.2	0.2	0.1	0.2	-0.7
Other .....	0.1	0.2	0.2	0.2	0.4	0.5	0.8	1.2	7.1
Total World .....	85.7	81.9	81.6	84.8	89.4	93.9	97.8	102.9	0.9
OPEC Share of World Production .....	38%	43%	43%	43%	44%	46%	46%	46%	
Persian Gulf Share of World Production ..	25%	29%	29%	28%	29%	30%	31%	31%	

Note: Conventional liquids include crude oil and lease condensate, natural gas plant liquids, and refinery gain.

Sources: History: Energy Information Administration (EIA), Office of Energy Markets and End Use. Projections: EIA, Generate World Oil Balance Model (2008).



**Table A3. World Total Liquids Production by Region and Country, High Price Case, 1990-2030.**  
(Million Barrels Oil Equivalent per Day)

Region/Country	History (Estimates)			Projections					Average Annual Percent Change, 2005-2030
	1990	2005	2006	2010	2015	2020	2025	2030	
OPEC <sup>a</sup>	25.2	36.1	35.8	37.3	35.4	35.0	34.9	35.5	-0.1
Asia (Indonesia)	1.5	1.1	1.1	0.9	0.8	0.7	0.7	0.7	-1.8
Middle East	16.1	23.8	23.6	23.7	22.4	22.3	22.0	22.1	-0.3
Iran	3.1	4.2	4.1	4.1	3.4	3.0	2.9	2.9	-1.5
Iraq	2.1	1.9	2.0	2.0	1.8	2.5	2.6	2.6	1.3
Kuwait	1.2	2.7	2.7	2.6	2.5	2.3	2.2	2.2	-0.7
Qatar	0.4	1.1	1.1	1.6	2.0	2.4	2.6	2.8	3.7
Saudi Arabia	7.0	11.1	10.7	10.5	10.2	9.7	9.4	9.4	-0.7
United Arab Emirates	2.3	2.8	2.9	2.9	2.5	2.4	2.3	2.2	-1.0
North Africa	2.7	3.8	3.9	4.7	4.3	4.0	3.9	4.1	0.2
Algeria	1.3	2.1	2.1	2.7	2.7	2.6	2.7	2.8	1.2
Libya	1.4	1.7	1.8	2.0	1.6	1.3	1.2	1.2	-1.4
West Africa	2.3	3.9	3.9	5.0	4.8	4.5	4.4	4.5	0.5
Angola	0.5	1.3	1.4	2.4	2.2	2.1	2.0	2.0	1.9
Nigeria	1.8	2.6	2.4	2.6	2.6	2.4	2.4	2.4	-0.3
South America	2.5	3.4	3.3	3.0	3.0	3.5	3.9	4.1	0.8
Ecuador	0.3	0.5	0.5	0.4	0.4	0.4	0.4	0.4	-1.3
Venezuela	2.3	2.9	2.8	2.5	2.6	3.1	3.5	3.8	1.1
Non-OPEC	41.1	48.2	48.4	51.4	54.3	56.7	60.3	63.7	1.1
OECD	20.0	21.8	21.4	21.5	22.4	23.8	25.7	27.6	1.0
OECD North America	14.7	15.1	15.2	16.2	17.9	19.9	21.8	23.8	1.8
United States	9.7	8.2	8.2	8.2	9.7	10.3	10.9	11.5	1.3
Canada	2.0	3.1	3.3	3.9	5.6	7.3	8.6	9.8	4.7
Mexico	3.0	3.8	3.7	3.1	2.6	2.3	2.4	2.5	-1.6
OECD Europe	4.5	5.9	5.5	4.5	3.8	3.2	3.1	3.0	-2.7
OECD Asia	0.8	0.7	0.7	0.8	0.8	0.8	0.8	0.8	0.4
Japan	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.5
South Korea	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	8.4
Australia and New Zealand	0.7	0.6	0.6	0.6	0.6	0.6	0.6	0.6	-0.1
Non-OECD	21.1	26.5	26.9	29.9	31.9	32.9	34.7	36.1	1.3
Non-OECD Europe and Eurasia	11.6	11.9	12.3	14.2	15.1	14.9	15.2	15.5	1.0
Russia	10.1	9.5	9.7	10.4	10.8	10.7	10.9	11.0	0.6
Caspian Area	1.1	2.1	2.3	3.5	4.0	4.0	4.1	4.2	2.8
Other	0.4	0.3	0.3	0.3	0.2	0.2	0.2	0.2	-1.4
Non-OECD Asia	4.4	6.5	6.5	6.4	6.9	7.0	7.2	7.2	0.4
China	2.8	3.7	3.8	3.6	3.8	3.7	3.8	3.8	0.1
India	0.7	0.8	0.8	1.0	1.1	1.2	1.4	1.3	2.0
Other	1.0	1.9	1.9	1.9	2.0	2.0	2.0	2.1	0.3
Middle East (Non-OPEC)	1.3	1.7	1.6	1.5	1.5	1.4	1.4	1.4	-0.9
Africa	1.7	2.6	2.6	2.9	3.3	3.7	4.0	4.3	2.1
Central and South America	2.1	3.8	3.9	5.0	5.2	5.9	6.9	7.8	2.9
Brazil	0.8	1.9	2.1	3.2	3.6	4.3	5.0	5.5	4.2
Other	1.3	1.8	1.9	1.7	1.6	1.6	1.9	2.3	0.8
Total World	66.3	84.3	84.2	88.7	89.7	91.7	95.2	99.3	0.7
OPEC Share of World Production	38%	43%	43%	42%	39%	38%	37%	36%	
Persian Gulf Share of World Production	24%	28%	28%	27%	25%	24%	23%	22%	

<sup>a</sup>OPEC = Organization of the Petroleum Exporting Countries (OPEC-13).

Sources: History: Energy Information Administration (EIA), Office of Energy Markets and End Use. Projections: EIA, Generate World Oil Balance Model (2008).

**Table A4. World Conventional Liquids Production by Region and Country, High Price Case, 1990-2030. (Million Barrels Oil Equivalent per Day)**

Region/Country	History (Estimates)			Projections					Average Annual Percent Change, 2005-2030
	1990	2005	2006	2010	2015	2020	2025	2030	
OPEC <sup>a</sup>	25.2	35.3	35.1	36.3	34.0	33.0	32.5	32.8	-0.3
Asia (Indonesia)	1.5	1.1	1.1	0.9	0.8	0.7	0.7	0.6	-2.3
Middle East	16.1	23.8	23.5	23.6	22.3	22.0	21.6	21.7	-0.4
Iran	3.1	4.2	4.1	4.1	3.4	3.0	2.9	2.9	-1.5
Iraq	2.1	1.9	2.0	2.0	1.8	2.5	2.6	2.6	1.3
Kuwait	1.2	2.7	2.7	2.6	2.5	2.3	2.2	2.2	-0.7
Qatar	0.4	1.1	1.1	1.6	1.8	2.1	2.2	2.4	3.1
Saudi Arabia	7.0	11.0	10.6	10.4	10.2	9.7	9.4	9.4	-0.6
United Arab Emirates	2.3	2.8	2.9	2.9	2.5	2.4	2.3	2.2	-1.0
North Africa	2.7	3.8	3.9	4.7	4.3	4.0	3.9	4.1	0.2
Algeria	1.3	2.1	2.1	2.7	2.7	2.6	2.7	2.8	1.2
Libya	1.4	1.7	1.8	2.0	1.6	1.3	1.2	1.2	-1.4
West Africa	2.3	3.9	3.9	5.0	4.8	4.4	4.3	4.4	0.5
Angola	0.5	1.3	1.4	2.4	2.2	2.1	2.0	2.0	1.9
Nigeria	1.8	2.6	2.4	2.6	2.6	2.4	2.3	2.4	-0.4
South America	2.5	2.7	2.7	2.1	1.9	1.9	2.0	2.0	-1.3
Ecuador	0.3	0.5	0.5	0.4	0.4	0.4	0.4	0.4	-1.3
Venezuela	2.3	2.2	2.1	1.7	1.5	1.6	1.6	1.6	-1.2
Non-OPEC	40.5	46.5	46.5	46.5	47.3	46.3	47.1	47.5	0.1
OECD	19.5	20.3	19.8	18.7	17.0	16.0	15.9	15.6	-1.1
OECD North America	14.3	13.7	13.6	13.5	12.7	12.3	12.3	12.1	-0.5
United States	9.6	7.9	7.8	8.5	8.6	8.9	8.9	8.6	0.4
Canada	1.7	2.0	2.1	1.9	1.5	1.2	1.1	1.0	-2.7
Mexico	3.0	3.8	3.7	3.1	2.6	2.2	2.3	2.4	-1.8
OECD Europe	4.5	5.9	5.5	4.5	3.6	3.0	2.9	2.8	-3.0
Denmark	0.1	0.4	0.3	0.3	0.2	0.1	0.1	0.1	-5.9
Norway	1.7	3.0	2.8	2.4	1.9	1.6	1.5	1.4	-3.0
United Kingdom	2.0	1.9	1.7	1.2	1.0	0.7	0.7	0.7	-3.8
Other	0.7	0.7	0.7	0.6	0.6	0.6	0.6	0.6	-0.5
OECD Asia	0.8	0.7	0.7	0.8	0.7	0.7	0.7	0.7	0.0
Japan	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.5
South Korea	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8
Australia and New Zealand	0.7	0.6	0.6	0.6	0.6	0.6	0.6	0.6	-0.1

<sup>a</sup>OPEC = Organization of the Petroleum Exporting Countries (OPEC-13).

(Continued)

Table A4. World Conventional Liquids Production by Region and Country, High Price Case, 1990-2030. (Million Barrels Oil Equivalent per Day)

Region/Country	History (Estimates)			Projections					Average Annual Percent Change, 2005-2030
	1990	2005	2006	2010	2015	2020	2025	2030	
Non-OECD .....	21.0	26.2	26.7	29.8	30.2	30.3	31.2	31.9	0.8
Non-OECD Europe and Eurasia .....	11.6	11.9	12.3	14.2	15.0	14.9	15.2	15.5	1.0
Russia .....	10.1	9.5	9.7	10.4	10.8	10.7	10.9	11.0	0.6
Caspian Area .....	1.1	2.1	2.3	3.5	4.0	4.0	4.1	4.2	2.8
Azerbaijan .....	0.3	0.4	0.6	1.3	1.2	1.1	0.9	0.8	2.6
Kazakhstan .....	0.6	1.3	1.4	1.9	2.5	2.6	2.7	3.0	3.2
Turkmenistan .....	0.1	0.2	0.2	0.2	0.3	0.3	0.3	0.3	1.7
Uzbekistan .....	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	-1.7
Other .....	0.4	0.3	0.3	0.3	0.2	0.2	0.2	0.2	-1.7
Non-OECD Asia .....	4.4	6.5	6.6	6.7	6.5	6.3	6.2	5.8	-0.5
China .....	2.8	3.8	3.8	3.7	3.6	3.3	3.2	3.0	-0.9
India .....	0.7	0.8	0.8	1.0	1.0	1.0	1.1	0.9	0.5
Brunei .....	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	-0.2
Malaysia .....	0.6	0.7	0.7	0.6	0.6	0.7	0.6	0.6	-0.6
Thailand .....	0.1	0.3	0.3	0.4	0.4	0.4	0.4	0.4	1.0
Vietnam .....	0.1	0.4	0.4	0.5	0.5	0.5	0.5	0.4	0.5
Other .....	0.1	0.3	0.3	0.3	0.3	0.2	0.2	0.2	-1.4
Middle East (Non-OPEC) .....	1.3	1.7	1.6	1.5	1.5	1.4	1.4	1.4	-0.9
Oman .....	0.7	0.8	0.7	0.7	0.8	0.7	0.7	0.7	-0.4
Syria .....	0.4	0.5	0.4	0.4	0.4	0.3	0.3	0.3	-2.0
Yemen .....	0.2	0.4	0.4	0.3	0.3	0.3	0.3	0.3	-0.9
Other .....	0.0	0.1	0.1	0.1	0.0	0.0	0.0	0.0	-0.7
Africa .....	1.6	2.4	2.4	2.8	2.8	2.9	3.1	3.3	1.2
Chad .....	0.0	0.2	0.2	0.2	0.2	0.2	0.2	0.3	1.9
Congo (Brazzaville) .....	0.2	0.2	0.2	0.2	0.3	0.4	0.4	0.5	2.8
Egypt .....	0.9	0.7	0.7	0.6	0.6	0.7	0.7	0.6	-0.3
Equatorial Guinea .....	0.0	0.4	0.4	0.5	0.4	0.4	0.4	0.4	-0.2
Gabon .....	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	-0.9
Sao Tome and Principe .....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	—
Sudan .....	0.0	0.4	0.4	0.7	0.6	0.6	0.7	0.7	3.0
Other .....	0.3	0.3	0.4	0.4	0.4	0.4	0.5	0.5	1.8
Central and South America .....	2.0	3.6	3.7	4.7	4.5	4.8	5.4	6.0	2.1
Brazil .....	0.7	1.8	1.9	2.9	3.0	3.3	3.7	4.0	3.4
Argentina .....	0.5	0.8	0.8	0.7	0.6	0.4	0.4	0.3	-3.3
Colombia .....	0.5	0.5	0.5	0.5	0.3	0.3	0.3	0.2	-3.2
Peru .....	0.1	0.1	0.1	0.1	0.2	0.2	0.3	0.3	4.1
Trinidad and Tobago .....	0.1	0.2	0.2	0.2	0.2	0.1	0.1	0.1	-1.0
Other .....	0.1	0.2	0.2	0.2	0.3	0.5	0.7	0.9	6.2
Total World .....	65.7	81.9	81.6	84.9	81.3	79.4	79.7	80.3	-0.1
OPEC Share of World Production .....	38%	43%	43%	43%	42%	42%	41%	41%	
Persian Gulf Share of World Production ..	25%	29%	29%	28%	27%	28%	27%	27%	

Note: Conventional liquids include crude oil and lease condensate, natural gas plant liquids, and refinery gain.

Sources: History: Energy Information Administration (EIA), Office of Energy Markets and End Use. Projections: EIA, Generate World Oil Balance Model (2008).

**Table A5. World Total Liquids Production by Region and Country, Low Price Case, 1990-2030.**  
(Million Barrels Oil Equivalent per Day)

Region/Country	History (Estimates)			Projections					Average Annual Percent Change, 2005-2030
	1990	2005	2006	2010	2015	2020	2025	2030	
OPEC <sup>a</sup>	25.2	36.1	35.8	38.4	45.3	51.5	55.8	60.0	2.1
Asia (Indonesia)	1.5	1.1	1.1	1.0	1.0	1.1	1.1	1.2	0.0
Middle East	16.1	23.8	23.6	24.4	29.1	33.7	36.4	39.0	2.0
Iran	3.1	4.2	4.1	4.2	4.4	4.7	5.1	5.5	1.0
Iraq	2.1	1.9	2.0	2.1	2.4	4.0	4.5	5.0	4.0
Kuwait	1.2	2.7	2.7	2.7	3.3	3.5	3.7	4.1	1.7
Qatar	0.4	1.1	1.1	1.6	2.4	3.1	3.5	3.9	5.1
Saudi Arabia	7.0	11.1	10.7	10.8	13.3	14.8	15.8	16.8	1.7
United Arab Emirates	2.3	2.8	2.9	3.0	3.3	3.6	3.8	3.8	1.2
North Africa	2.7	3.8	3.9	4.8	5.5	6.0	6.5	7.1	2.5
Algeria	1.3	2.1	2.1	2.8	3.5	3.9	4.4	4.9	3.5
Libya	1.4	1.7	1.8	2.0	2.0	2.1	2.1	2.1	0.9
West Africa	2.3	3.9	3.9	5.2	6.3	6.9	7.5	8.2	3.0
Angola	0.5	1.3	1.4	2.5	2.9	3.3	3.5	3.9	4.6
Nigeria	1.8	2.6	2.4	2.6	3.4	3.6	4.0	4.3	2.0
South America	2.5	3.4	3.3	3.0	3.3	3.9	4.3	4.6	1.2
Ecuador	0.3	0.5	0.5	0.5	0.5	0.6	0.7	0.7	1.3
Venezuela	2.3	2.9	2.8	2.6	2.7	3.3	3.7	3.9	1.2
Non-OPEC	41.1	48.2	48.4	51.3	53.9	56.2	58.8	62.0	1.0
OECD	20.0	21.8	21.4	21.4	20.6	19.9	19.7	19.4	-0.5
OECD North America	14.7	15.1	15.2	15.1	15.8	15.5	15.2	14.8	-0.1
United States	9.7	8.2	8.2	9.4	10.1	10.2	9.8	9.2	0.5
Canada	2.0	3.1	3.3	3.6	2.9	2.7	2.6	2.6	-0.7
Mexico	3.0	3.8	3.7	3.1	2.8	2.5	2.7	3.0	-0.9
OECD Europe	4.5	5.9	5.5	4.5	4.0	3.6	3.6	3.7	-1.9
OECD Asia	0.8	0.7	0.7	0.8	0.8	0.8	0.9	1.0	1.0
Japan	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	1.9
South Korea	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0
Australia and New Zealand	0.7	0.6	0.6	0.6	0.6	0.7	0.7	0.7	0.7
Non-OECD	21.1	26.5	26.9	29.9	33.3	36.2	39.1	42.6	1.9
Non-OECD Europe and Eurasia	11.6	11.9	12.3	14.2	16.3	17.5	18.7	20.3	2.2
Russia	10.1	9.5	9.7	10.4	11.7	12.6	13.5	14.6	1.7
Caspian Area	1.1	2.1	2.3	3.5	4.3	4.7	5.0	5.5	3.9
Other	0.4	0.3	0.3	0.3	0.3	0.2	0.3	0.3	-0.7
Non-OECD Asia	4.4	6.5	6.5	6.4	7.2	7.6	7.8	7.8	0.8
China	2.8	3.7	3.8	3.5	3.9	4.1	4.1	4.2	0.5
India	0.7	0.8	0.8	1.0	1.1	1.2	1.3	1.2	1.7
Other	1.0	1.9	1.9	1.9	2.1	2.3	2.3	2.4	0.9
Middle East (Non-OPEC)	1.3	1.7	1.6	1.5	1.6	1.6	1.7	1.8	0.1
Africa	1.7	2.6	2.6	2.9	3.2	3.6	4.0	4.5	2.3
Central and South America	2.1	3.8	3.9	4.9	5.1	5.9	6.9	8.2	3.1
Brazil	0.8	1.9	2.1	3.2	3.4	4.1	4.8	5.6	4.3
Other	1.3	1.8	1.9	1.7	1.7	1.8	2.1	2.6	1.4
Total World	66.3	84.3	84.2	89.7	99.2	107.7	114.6	122.0	1.5
OPEC Share of World Production	38%	43%	43%	43%	46%	48%	49%	49%	
Persian Gulf Share of World Production	24%	28%	28%	27%	29%	31%	32%	32%	

<sup>a</sup>OPEC = Organization of the Petroleum Exporting Countries (OPEC-13).

Sources: History: Energy Information Administration (EIA), Office of Energy Markets and End Use. Projections: EIA, Generate World Oil Balance Model (2008).

**Table A6. World Conventional Liquids Production by Region and Country, Low Price Case, 1990-2030. (Million Barrels Oil Equivalent per Day)**

Region/Country	History (Estimates)			Projections					Average Annual Percent Change, 2005-2030
	1990	2005	2006	2010	2015	2020	2025	2030	
OPEC <sup>a</sup>	25.2	35.3	35.1	37.4	44.3	50.3	54.5	58.6	2.0
Asia (Indonesia)	1.5	1.1	1.1	1.0	1.0	1.0	1.1	1.1	-0.1
Middle East	16.1	23.8	23.5	24.3	29.0	33.5	36.1	38.8	2.0
Iran	3.1	4.2	4.1	4.2	4.4	4.7	5.1	5.5	1.0
Iraq	2.1	1.9	2.0	2.1	2.4	4.0	4.5	5.0	4.0
Kuwait	1.2	2.7	2.7	2.7	3.3	3.5	3.7	4.1	1.7
Qatar	0.4	1.1	1.1	1.6	2.3	2.9	3.3	3.7	4.9
Saudi Arabia	7.0	11.0	10.6	10.7	13.3	14.8	15.8	16.8	1.7
United Arab Emirates	2.3	2.8	2.9	3.0	3.3	3.6	3.8	3.8	1.2
North Africa	2.7	3.8	3.9	4.8	5.5	6.0	6.5	7.1	2.5
Algeria	1.3	2.1	2.1	2.8	3.5	3.9	4.4	4.9	3.5
Libya	1.4	1.7	1.8	2.0	2.0	2.1	2.1	2.1	0.9
West Africa	2.3	3.9	3.9	5.2	6.3	6.9	7.5	8.2	3.0
Angola	0.5	1.3	1.4	2.5	2.9	3.3	3.5	3.9	4.6
Nigeria	1.8	2.6	2.4	2.7	3.4	3.6	3.9	4.3	2.0
South America	2.5	2.7	2.7	2.2	2.4	2.9	3.3	3.5	1.0
Ecuador	0.3	0.5	0.5	0.5	0.5	0.6	0.7	0.7	1.3
Venezuela	2.3	2.2	2.1	1.7	1.9	2.3	2.7	2.8	1.0
Non-OPEC	40.5	46.5	46.5	48.9	51.0	53.0	55.2	58.4	0.9
OECD	19.5	20.3	19.8	19.0	18.2	17.3	16.8	16.5	-0.8
OECD North America	14.3	13.7	13.6	13.7	13.5	12.9	12.3	11.9	-0.5
United States	9.6	7.9	7.8	8.7	9.1	9.1	8.4	7.7	-0.1
Canada	1.7	2.0	2.1	1.9	1.6	1.4	1.3	1.2	-2.0
Mexico	3.0	3.8	3.7	3.1	2.8	2.5	2.7	3.0	-0.9
OECD Europe	4.5	5.9	5.5	4.5	4.0	3.6	3.6	3.6	-1.8
Denmark	0.1	0.4	0.3	0.3	0.2	0.2	0.1	0.1	-4.8
Norway	1.7	3.0	2.8	2.4	2.0	1.8	1.8	1.7	-2.1
United Kingdom	2.0	1.9	1.7	1.2	1.0	0.9	0.9	0.9	-2.8
Other	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.8	0.9
OECD Asia	0.8	0.7	0.7	0.8	0.8	0.8	0.9	0.9	1.0
Japan	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	1.9
South Korea	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.4
Australia and New Zealand	0.7	0.6	0.6	0.6	0.6	0.7	0.7	0.7	0.7

<sup>a</sup>OPEC = Organization of the Petroleum Exporting Countries (OPEC-13).

(Continued)

Table A6. World Conventional Liquids Production by Region and Country, Low Price Case, 1990-2030. (Million Barrels Oil Equivalent per Day)

Region/Country	History (Estimates)			Projections					Average Annual Percent Change, 2005-2030
	1990	2005	2006	2010	2015	2020	2025	2030	
Non-OECD .....	21.0	26.2	26.7	29.9	32.7	35.6	38.5	41.9	1.9
Non-OECD Europe and Eurasia .....	11.6	11.9	12.3	14.2	16.3	17.5	18.7	20.3	2.2
Russia .....	10.1	9.5	9.7	10.4	11.7	12.6	13.5	14.6	1.7
Caspian Area .....	1.1	2.1	2.3	3.5	4.3	4.7	5.0	5.5	3.9
Azerbaijan .....	0.3	0.4	0.6	1.3	1.3	1.2	1.2	1.1	3.8
Kazakhstan .....	0.6	1.3	1.4	1.9	2.7	3.0	3.3	3.9	4.3
Turkmenistan .....	0.1	0.2	0.2	0.2	0.3	0.3	0.4	0.4	2.8
Uzbekistan .....	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	-1.0
Other .....	0.4	0.3	0.3	0.3	0.2	0.2	0.3	0.3	-0.6
Non-OECD Asia .....	4.4	6.5	6.6	6.7	7.0	7.4	7.6	7.6	0.6
China .....	2.8	3.8	3.8	3.7	3.8	4.0	4.0	4.1	0.3
India .....	0.7	0.8	0.9	1.0	1.0	1.2	1.3	1.2	1.4
Brunei .....	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.9
Malaysia .....	0.8	0.7	0.7	0.6	0.7	0.8	0.8	0.8	0.3
Thailand .....	0.1	0.3	0.3	0.4	0.4	0.4	0.4	0.5	1.7
Vietnam .....	0.1	0.4	0.4	0.5	0.5	0.5	0.5	0.6	1.4
Other .....	0.1	0.3	0.3	0.3	0.3	0.3	0.3	0.3	-0.2
Middle East (Non-OPEC) .....	1.3	1.7	1.6	1.5	1.6	1.6	1.7	1.8	0.1
Oman .....	0.7	0.8	0.7	0.7	0.8	0.8	0.9	0.9	0.7
Syria .....	0.4	0.5	0.4	0.4	0.4	0.4	0.4	0.4	-1.2
Yemen .....	0.2	0.4	0.4	0.3	0.3	0.4	0.4	0.4	0.2
Other .....	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.3
Africa .....	1.6	2.4	2.4	2.8	3.0	3.5	3.9	4.3	2.3
Chad .....	0.0	0.2	0.2	0.2	0.2	0.3	0.3	0.4	3.1
Congo (Brazzaville) .....	0.2	0.2	0.2	0.2	0.3	0.4	0.5	0.6	4.0
Egypt .....	0.9	0.7	0.7	0.6	0.6	0.8	0.8	0.8	0.7
Equatorial Guinea .....	0.0	0.4	0.4	0.5	0.4	0.4	0.5	0.5	0.8
Gabon .....	0.3	0.3	0.2	0.2	0.2	0.2	0.3	0.3	0.3
Sao Tome and Principe .....	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	—
Sudan .....	0.0	0.4	0.4	0.7	0.7	0.7	0.8	1.0	4.3
Other .....	0.3	0.3	0.4	0.4	0.4	0.5	0.6	0.6	3.0
Central and South America .....	2.0	3.6	3.7	4.7	4.9	5.6	6.7	7.9	3.2
Brazil .....	0.7	1.8	1.9	2.9	3.3	3.9	4.6	5.4	4.6
Argentina .....	0.5	0.8	0.8	0.7	0.5	0.5	0.4	0.4	-2.4
Colombia .....	0.5	0.5	0.5	0.5	0.4	0.3	0.3	0.3	-2.1
Peru .....	0.1	0.1	0.1	0.1	0.2	0.2	0.3	0.4	5.1
Trinidad and Tobago .....	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	-0.4
Other .....	0.1	0.2	0.2	0.2	0.4	0.5	0.8	1.2	7.5
Total World .....	65.7	81.9	81.6	86.3	95.2	103.3	109.8	117.1	1.4
OPEC Share of World Production .....	38%	43%	43%	43%	46%	49%	50%	50%	
Persian Gulf Share of World Production .....	25%	29%	29%	28%	30%	32%	33%	33%	

Note: Conventional liquids include crude oil and lease condensate, natural gas plant liquids, and refinery gain.

Sources: History: Energy Information Administration (EIA), Office of Energy Markets and End Use. Projections: EIA, Generate World Oil Balance Model (2008).

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**Table A7. World Total Liquids Production by Region and Country, High Economic Growth Case, 1990-2030. (Million Barrels Oil Equivalent per Day)**

Region/Country	History (Estimates)			Projections					Average Annual Percent Change, 2005-2030
	1990	2005	2006	2010	2015	2020	2025	2030	
OPEC <sup>a</sup>	25.2	36.1	35.8	38.2	42.2	46.8	50.8	55.0	1.7
Asia (Indonesia)	1.5	1.1	1.1	1.0	1.0	1.0	1.1	1.1	-0.3
Middle East	16.1	23.8	23.6	24.2	26.8	30.1	32.5	35.0	1.5
Iran	3.1	4.2	4.1	4.2	4.0	4.2	4.5	4.9	0.6
Iraq	2.1	1.9	2.0	2.1	2.2	3.5	4.0	4.4	3.5
Kuwait	1.2	2.7	2.7	2.7	3.0	3.1	3.3	3.6	1.2
Qatar	0.4	1.1	1.1	1.6	2.3	2.9	3.3	3.7	4.9
Saudi Arabia	7.0	11.1	10.7	10.8	12.3	13.3	14.0	15.0	1.2
United Arab Emirates	2.3	2.8	2.9	3.0	3.0	3.2	3.3	3.4	0.7
North Africa	2.7	3.8	3.9	4.8	5.1	5.3	5.7	6.3	2.0
Algeria	1.3	2.1	2.1	2.8	3.2	3.5	3.9	4.4	3.0
Libya	1.4	1.7	1.8	2.0	1.9	1.8	1.8	1.9	0.4
West Africa	2.3	3.9	3.9	5.1	5.8	6.2	6.7	7.4	2.6
Angola	0.5	1.3	1.4	2.5	2.7	2.9	3.1	3.4	4.1
Nigeria	1.8	2.6	2.4	2.6	3.1	3.3	3.5	3.9	1.6
South America	2.5	3.4	3.3	3.1	3.5	4.2	4.9	5.3	1.8
Ecuador	0.8	0.6	0.6	0.6	0.6	0.6	0.6	0.7	0.8
Venezuela	2.3	2.9	2.8	2.6	3.0	3.7	4.3	4.6	1.9
Non-OPEC	41.1	48.2	48.4	51.9	57.0	60.6	64.8	70.0	1.5
OECD	20.0	21.8	21.4	21.7	22.5	22.4	22.8	23.2	0.2
OECD North America	14.7	15.1	15.2	16.4	17.5	17.8	18.0	18.2	0.7
United States	9.7	8.2	8.2	9.4	10.1	10.2	9.8	9.2	0.5
Canada	2.0	3.1	3.3	3.9	4.6	4.9	5.3	5.7	2.5
Mexico	3.0	3.8	3.7	3.1	2.8	2.6	2.9	3.3	-0.6
OECD Europe	4.5	5.9	5.5	4.6	4.1	3.8	3.8	3.9	-1.6
OECD Asia	0.8	0.7	0.7	0.8	0.8	0.9	1.0	1.0	1.3
Japan	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	1.8
South Korea	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	6.2
Australia and New Zealand	0.7	0.6	0.6	0.6	0.6	0.7	0.7	0.8	1.0
Non-OECD	21.1	26.5	26.9	30.2	34.5	36.2	42.0	46.8	2.3
Non-OECD Europe and Eurasia	11.6	11.9	12.3	14.3	16.6	16.1	19.5	21.7	2.4
Russia	10.1	9.5	9.7	10.5	11.9	13.0	14.1	15.6	2.0
Caspian Area	1.1	2.1	2.3	3.5	4.4	4.8	5.2	5.9	4.2
Other	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	-0.4
Non-OECD Asia	4.4	6.5	6.5	6.5	7.5	8.0	8.5	8.8	1.2
China	2.8	3.7	3.8	3.6	4.1	4.3	4.5	4.7	0.9
India	0.7	0.8	0.8	1.0	1.2	1.3	1.5	1.5	2.3
Other	1.0	1.9	1.9	1.9	2.2	2.4	2.5	2.6	1.3
Middle East (Non-OPEC)	1.3	1.7	1.6	1.5	1.6	1.7	1.8	1.9	0.4
Africa	1.7	2.6	2.6	2.9	3.4	4.0	4.5	5.1	2.8
Central and South America	2.1	3.8	3.9	5.0	5.5	6.5	7.8	9.3	3.7
Brazil	0.8	1.9	2.1	3.3	3.7	4.6	5.5	6.5	4.9
Other	1.3	1.8	1.9	1.7	1.7	1.9	2.3	2.9	1.8
Total World	66.3	84.3	84.2	90.1	99.2	107.4	115.6	125.0	1.6
OPEC Share of World Production	38%	43%	43%	42%	43%	44%	44%	44%	
Persian Gulf Share of World Production	24%	28%	28%	27%	27%	28%	29%	28%	

<sup>a</sup>OPEC = Organization of the Petroleum Exporting Countries (OPEC-13).

Sources: History: Energy Information Administration (EIA), Office of Energy Markets and End Use. Projections: EIA, Generate World Oil Balance Model (2008).

Table A8. World Conventional Liquids Production by Region and Country, High Economic



**Growth Case, 1990-2030. (Million Barrels Oil Equivalent per Day)**

Region/Country	History (Estimates)			Projections					Average Annual Percent Change, 2005-2030
	1990	2005	2006	2010	2015	2020	2025	2030	
OPEC <sup>a</sup>	25.2	35.3	35.1	37.2	40.6	44.8	48.3	52.3	1.6
Asia (Indonesia)	1.5	1.1	1.1	1.0	0.9	0.9	1.0	1.0	-0.6
Middle East	16.1	23.8	23.5	24.1	26.6	29.8	32.1	34.6	1.5
Iran	3.1	4.2	4.1	4.2	4.0	4.2	4.5	4.9	0.6
Iraq	2.1	1.9	2.0	2.1	2.2	3.5	4.0	4.4	3.5
Kuwait	1.2	2.7	2.7	2.7	3.0	3.1	3.3	3.6	1.2
Qatar	0.4	1.1	1.1	1.6	2.1	2.6	2.9	3.3	4.4
Saudi Arabia	7.0	11.0	10.6	10.7	12.3	13.3	14.0	15.0	1.2
United Arab Emirates	2.3	2.8	2.9	3.0	3.0	3.2	3.3	3.4	0.7
North Africa	2.7	3.8	3.9	4.8	5.1	5.3	5.7	6.3	2.0
Algeria	1.3	2.1	2.1	2.8	3.2	3.5	3.9	4.4	3.0
Libya	1.4	1.7	1.8	2.0	1.9	1.8	1.8	1.9	0.4
West Africa	2.3	3.9	3.9	5.2	5.8	6.1	6.6	7.3	2.5
Angola	0.5	1.3	1.4	2.5	2.7	2.9	3.1	3.4	4.1
Nigeria	1.8	2.6	2.4	2.6	3.1	3.2	3.5	3.8	1.5
South America	2.5	2.7	2.7	2.2	2.2	2.6	3.0	3.1	0.6
Ecuador	0.3	0.5	0.5	0.5	0.5	0.5	0.6	0.7	0.8
Venezuela	2.3	2.2	2.1	1.7	1.7	2.1	2.4	2.5	0.5
Non-OPEC	40.5	46.5	46.5	49.1	51.6	54.3	57.3	61.7	1.1
OECD	19.5	20.3	19.8	19.1	18.4	17.6	17.1	17.0	-0.7
OECD North America	14.3	13.7	13.6	13.7	13.6	13.1	12.5	12.2	-0.5
United States	9.6	7.9	7.8	8.7	9.1	9.1	8.4	7.7	-0.1
Canada	1.7	2.0	2.1	1.9	1.7	1.4	1.3	1.3	-1.8
Mexico	3.0	3.8	3.7	3.1	2.8	2.6	2.8	3.2	-0.7
OECD Europe	4.5	5.9	5.5	4.5	4.0	3.7	3.7	3.8	-1.7
Denmark	0.1	0.4	0.3	0.3	0.2	0.2	0.1	0.1	-4.6
Norway	1.7	3.0	2.8	2.4	2.1	1.9	1.9	1.9	-1.9
United Kingdom	2.0	1.9	1.7	1.2	1.1	0.9	0.9	1.0	-2.6
Other	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.9	0.9
OECD Asia	0.8	0.7	0.7	0.8	0.8	0.9	0.9	1.0	1.1
Japan	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	1.8
South Korea	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.3
Australia and New Zealand	0.7	0.6	0.6	0.6	0.6	0.7	0.7	0.8	1.0

<sup>a</sup>OPEC = Organization of the Petroleum Exporting Countries (OPEC-13).

(Continued)

Table A8. World Conventional Liquids Production by Region and Country, High Economic Growth Case, 1990-2030. (Million Barrels Oil Equivalent per Day)

Region/Country	History (Estimates)			Projections					Average Annual Percent Change, 2005-2030
	1990	2005	2006	2010	2015	2020	2025	2030	
Non-OECD .....	21.0	26.2	26.7	30.1	33.3	36.7	40.2	44.7	2.2
Non-OECD Europe and Eurasia.....	11.6	11.9	12.3	14.3	16.6	18.1	19.5	21.7	2.4
Russia .....	10.1	9.5	9.7	10.5	11.9	13.0	14.1	15.6	2.0
Caspian Area .....	1.1	2.1	2.3	3.5	4.4	4.8	5.2	5.9	4.2
Azerbaijan .....	0.3	0.4	0.6	1.4	1.3	1.3	1.2	1.2	4.1
Kazakhstan .....	0.6	1.3	1.4	1.9	2.7	3.1	3.5	4.1	4.6
Turkmenistan .....	0.1	0.2	0.2	0.2	0.3	0.3	0.4	0.4	3.1
Uzbekistan .....	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	-0.7
Other .....	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	-0.4
Non-OECD Asia.....	4.4	6.5	6.6	6.8	7.1	7.6	7.9	8.1	0.8
China.....	2.8	3.8	3.8	3.7	3.9	4.1	4.2	4.3	0.5
India .....	0.7	0.8	0.9	1.0	1.1	1.2	1.3	1.3	1.6
Brunei .....	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	1.1
Malaysia .....	0.6	0.7	0.7	0.6	0.7	0.8	0.8	0.9	0.6
Thailand .....	0.1	0.3	0.3	0.4	0.4	0.4	0.5	0.5	1.9
Vietnam.....	0.1	0.4	0.4	0.5	0.5	0.6	0.6	0.6	1.7
Other .....	0.1	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.0
Middle East (Non-OPEC) .....	1.3	1.7	1.6	1.5	1.6	1.7	1.8	1.9	0.4
Oman .....	0.7	0.8	0.7	0.7	0.8	0.9	0.9	1.0	0.9
Syria .....	0.4	0.5	0.4	0.4	0.4	0.4	0.4	0.4	-0.9
Yemen.....	0.2	0.4	0.4	0.3	0.3	0.4	0.4	0.5	0.5
Other .....	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.5
Africa .....	1.6	2.4	2.4	2.8	3.1	3.6	4.0	4.6	2.6
Chad .....	0.0	0.2	0.2	0.2	0.2	0.3	0.3	0.4	3.4
Congo (Brazzaville).....	0.2	0.2	0.2	0.2	0.3	0.5	0.6	0.7	4.3
Egypt.....	0.9	0.7	0.7	0.6	0.7	0.8	0.8	0.8	1.0
Equatorial Guinea.....	0.0	0.4	0.4	0.5	0.4	0.5	0.5	0.5	1.0
Gabon .....	0.3	0.3	0.2	0.2	0.2	0.2	0.3	0.3	0.6
Sao Tome and Principe.....	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	—
Sudan .....	0.0	0.4	0.4	0.7	0.7	0.8	0.9	1.1	4.5
Other .....	0.3	0.3	0.4	0.4	0.4	0.5	0.6	0.7	3.2
Central and South America .....	2.0	3.6	3.7	4.7	5.0	5.8	7.0	8.4	3.5
Brazil .....	0.7	1.8	1.9	3.0	3.3	4.0	4.8	5.7	4.8
Argentina.....	0.5	0.8	0.8	0.8	0.6	0.5	0.5	0.5	-2.2
Colombia.....	0.5	0.5	0.5	0.5	0.4	0.4	0.3	0.3	-1.8
Peru.....	0.1	0.1	0.1	0.1	0.2	0.2	0.3	0.4	5.4
Trinidad and Tobago.....	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	-0.2
Other .....	0.1	0.2	0.2	0.2	0.4	0.6	0.9	1.3	7.7
Total World .....	65.7	81.9	81.6	86.3	92.4	99.1	105.7	114.0	1.3
OPEC Share of World Production.....	33%	43%	43%	43%	44%	45%	46%	46%	
Persian Gulf Share of World Production..	25%	29%	29%	28%	29%	30%	30%	30%	

Note: Conventional liquids include crude oil and lease condensate, natural gas plant liquids, and refinery gain.

Sources: History: Energy Information Administration (EIA), Office of Energy Markets and End Use. Projections: EIA, Generate World Oil Balance Model (2008).

**Table A9. World Total Liquids Production by Region and Country, Low Economic Growth Case, 1990-2030. (Million Barrels Oil Equivalent per Day)**

Region/Country	History (Estimates)			Projections					Average Annual Percent Change, 2005-2030
	1990	2005	2006	2010	2015	2020	2025	2030	
OPEC <sup>a</sup>	25.2	36.1	35.8	37.8	40.6	43.1	44.1	45.0	0.9
Asia (Indonesia)	1.5	1.1	1.1	1.0	0.9	0.9	0.9	0.9	-1.1
Middle East	16.1	23.8	23.6	24.0	25.9	27.9	28.5	29.0	0.8
Iran	3.1	4.2	4.1	4.1	4.0	4.0	4.0	4.0	-0.2
Iraq	2.1	1.9	2.0	2.1	2.2	3.3	3.6	3.7	2.7
Kuwait	1.2	2.7	2.7	2.6	3.0	2.9	3.0	3.0	0.5
Qatar	0.4	1.1	1.1	1.6	2.2	2.7	2.9	3.0	4.1
Saudi Arabia	7.0	11.1	10.7	10.6	11.6	12.0	12.1	12.4	0.4
United Arab Emirates	2.3	2.8	2.9	3.0	3.0	3.0	3.0	2.9	0.0
North Africa	2.7	3.8	3.9	4.8	5.0	5.1	5.1	5.3	1.3
Algeria	1.3	2.1	2.1	2.7	3.2	3.3	3.5	3.7	2.3
Libya	1.4	1.7	1.8	2.0	1.9	1.7	1.7	1.6	-0.3
West Africa	2.3	3.9	3.9	5.1	5.7	5.8	5.9	6.1	1.8
Angola	0.5	1.3	1.4	2.5	2.7	2.7	2.8	2.8	3.3
Nigeria	1.8	2.6	2.4	2.6	3.1	3.1	3.1	3.2	0.8
South America	2.5	3.4	3.3	3.0	3.0	3.4	3.7	3.8	0.4
Ecuador	0.3	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.0
Venezuela	2.3	2.9	2.8	2.5	2.5	2.9	3.2	3.2	0.5
Non-OPEC	41.1	48.2	48.4	50.9	51.7	52.6	54.1	56.3	0.6
OECD	20.0	21.8	21.4	21.1	19.7	19.2	19.8	20.7	-0.2
OECD North America	14.7	15.1	15.2	15.9	15.1	15.2	15.9	16.8	0.4
United States	9.7	8.2	8.2	9.2	9.7	10.3	10.9	11.5	1.3
Canada	2.0	3.1	3.3	3.6	2.8	2.6	2.6	2.7	-0.5
Mexico	3.0	3.8	3.7	3.0	2.7	2.3	2.4	2.6	-1.5
OECD Europe	4.5	5.9	5.5	4.5	3.8	3.3	3.1	3.1	-2.6
OECD Asia	0.8	0.7	0.7	0.8	0.8	0.8	0.8	0.8	0.4
Japan	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.9
South Korea	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0
Australia and New Zealand	0.7	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.1
Non-OECD	21.1	26.5	26.9	29.7	32.0	33.3	34.3	35.6	1.2
Non-OECD Europe and Eurasia	11.6	11.9	12.3	14.1	15.7	16.1	16.3	16.9	1.4
Russia	10.1	9.5	9.7	10.3	11.3	11.6	11.8	12.1	1.0
Caspian Area	1.1	2.1	2.3	3.5	4.2	4.3	4.4	4.6	3.2
Other	0.4	0.3	0.3	0.3	0.2	0.2	0.2	0.2	-1.4
Non-OECD Asia	4.4	6.5	6.5	6.4	6.9	6.9	6.8	6.8	0.1
China	2.8	3.7	3.8	3.5	3.8	3.7	3.6	3.5	-0.3
India	0.7	0.8	0.8	1.0	1.1	1.1	1.2	1.1	1.1
Other	1.0	1.9	1.9	1.9	2.0	2.1	2.1	2.0	0.3
Middle East (Non-OPEC)	1.3	1.7	1.6	1.5	1.5	1.5	1.5	1.5	-0.6
Africa	1.7	2.6	2.6	2.9	3.0	3.3	3.5	3.8	1.6
Central and South America	2.1	3.8	3.9	4.9	4.9	5.4	6.1	6.9	2.4
Brazil	0.8	1.9	2.1	3.2	3.3	3.8	4.3	4.7	3.6
Other	1.3	1.8	1.9	1.7	1.6	1.6	1.9	2.2	0.7
Total World	66.3	84.3	84.2	88.7	92.3	95.6	98.3	101.3	0.7
OPEC Share of World Production	38%	43%	43%	43%	44%	45%	45%	44%	
Persian Gulf Share of World Production	24%	28%	28%	27%	28%	29%	29%	29%	

<sup>a</sup>OPEC = Organization of the Petroleum Exporting Countries (OPEC-13).

Sources: History: Energy Information Administration (EIA), Office of Energy Markets and End Use. Projections: EIA, Generate World Oil Balance Model (2008).

**Table A10. World Conventional Liquids Production by Region and Country, Low Economic Growth Case, 1990-2030. (Million Barrels Oil Equivalent per Day)**

Region/Country	History (Estimates)			Projections					Average Annual Percent Change, 2005-2030
	1990	2005	2006	2010	2015	2020	2025	2030	
OPEC <sup>a</sup>	25.2	35.3	35.1	36.9	39.6	41.9	42.8	43.6	0.8
Asia (Indonesia)	1.5	1.1	1.1	0.9	0.9	0.9	0.9	0.8	-1.2
Middle East	16.1	23.8	23.5	23.9	25.7	27.7	28.3	28.8	0.8
Iran	3.1	4.2	4.1	4.1	4.0	4.0	4.0	4.0	-0.2
Iraq	2.1	1.9	2.0	2.1	2.2	3.3	3.6	3.7	2.7
Kuwait	1.2	2.7	2.7	2.6	3.0	2.9	3.0	3.0	0.5
Qatar	0.4	1.1	1.1	1.6	2.1	2.5	2.6	2.8	3.8
Saudi Arabia	7.0	11.0	10.6	10.6	11.6	12.0	12.1	12.4	0.5
United Arab Emirates	2.3	2.8	2.9	3.0	3.0	3.0	3.0	2.9	0.0
North Africa	2.7	3.8	3.9	4.8	5.0	5.1	5.1	5.3	1.3
Algeria	1.3	2.1	2.1	2.7	3.2	3.3	3.5	3.7	2.3
Libya	1.4	1.7	1.8	2.0	1.9	1.7	1.7	1.6	-0.3
West Africa	2.3	3.9	3.9	5.1	5.7	5.8	5.9	6.1	1.8
Angola	0.5	1.3	1.4	2.6	2.7	2.7	2.8	2.8	3.3
Nigeria	1.8	2.6	2.4	2.6	3.0	3.1	3.1	3.2	0.8
South America	2.5	2.7	2.7	2.2	2.2	2.5	2.7	2.6	-0.1
Ecuador	0.3	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.0
Venezuela	2.3	2.2	2.1	1.7	1.7	2.0	2.1	2.1	-0.2
Non-OPEC	40.5	46.5	46.5	48.4	48.8	49.2	49.9	50.9	0.4
OECD	19.5	20.3	19.8	18.7	17.3	16.5	16.3	16.1	-0.9
OECD North America	14.3	13.7	13.6	13.5	12.8	12.5	12.5	12.3	-0.4
United States	9.6	7.9	7.8	8.5	8.6	8.9	8.9	8.6	0.4
Canada	1.7	2.0	2.1	1.9	1.5	1.3	1.1	1.1	-2.5
Mexico	3.0	3.8	3.7	3.0	2.7	2.3	2.4	2.6	-1.5
OECD Europe	4.5	5.9	5.5	4.5	3.8	3.2	3.1	3.0	-2.6
Denmark	0.1	0.4	0.3	0.3	0.2	0.2	0.1	0.1	-5.6
Norway	1.7	3.0	2.8	2.4	1.9	1.7	1.6	1.5	-2.8
United Kingdom	2.0	1.9	1.7	1.2	1.0	0.8	0.7	0.8	-3.5
Other	0.7	0.7	0.7	0.6	0.6	0.6	0.7	0.7	0.0
OECD Asia	0.8	0.7	0.7	0.7	0.7	0.8	0.8	0.8	0.3
Japan	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.9
South Korea	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4
Australia and New Zealand	0.7	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.1

<sup>a</sup>OPEC = Organization of the Petroleum Exporting Countries (OPEC-13).

(continued)

Table A10. World Conventional Liquids Production by Region and Country, Low Economic Growth Case, 1990-2030. (Million Barrels Oil Equivalent per Day)

Region/Country	History (Estimates)			Projections					Average Annual Percent Change, 2005-2030
	1990	2005	2006	2010	2015	2020	2025	2030	
Non-OECD .....	21.0	26.2	26.7	29.7	31.5	32.8	33.6	34.8	1.1
Non-OECD Europe and Eurasia .....	11.6	11.9	12.3	14.1	15.7	16.1	16.3	16.9	1.4
Russia .....	10.1	9.5	9.7	10.3	11.3	11.6	11.8	12.1	1.0
Caspian Area .....	1.1	2.1	2.3	3.5	4.2	4.3	4.4	4.6	3.2
Azerbaijan .....	0.3	0.4	0.6	1.3	1.3	1.1	1.0	0.9	3.0
Kazakhstan .....	0.6	1.3	1.4	1.9	2.6	2.8	2.9	3.2	3.6
Turkmenistan .....	0.1	0.2	0.2	0.2	0.3	0.3	0.3	0.3	2.0
Uzbekistan .....	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	-1.5
Other .....	0.4	0.3	0.3	0.3	0.2	0.2	0.2	0.2	-1.4
Non-OECD Asia .....	4.4	6.5	6.6	6.7	6.7	6.8	6.6	6.3	-0.1
China .....	2.8	3.8	3.8	3.7	3.7	3.6	3.4	3.3	-0.5
India .....	0.7	0.8	0.9	1.0	1.0	1.1	1.1	1.0	0.8
Brunei .....	0.2	0.2	0.2	0.2	0.2	0.3	0.2	0.2	0.1
Malaysia .....	0.6	0.7	0.7	0.6	0.6	0.7	0.7	0.7	-0.3
Thailand .....	0.1	0.3	0.3	0.4	0.4	0.4	0.4	0.4	1.2
Vietnam .....	0.1	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.8
Other .....	0.1	0.3	0.3	0.3	0.3	0.2	0.2	0.2	-1.0
Middle East (Non-OPEC) .....	1.3	1.7	1.6	1.5	1.5	1.5	1.5	1.5	-0.6
Oman .....	0.7	0.8	0.7	0.7	0.8	0.8	0.8	0.8	0.0
Syria .....	0.4	0.5	0.4	0.4	0.4	0.3	0.3	0.3	-1.8
Yemen .....	0.2	0.4	0.4	0.3	0.3	0.3	0.3	0.3	-0.6
Other .....	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	-0.4
Africa .....	1.6	2.4	2.4	2.6	2.9	3.2	3.4	3.6	1.6
Chad .....	0.0	0.2	0.2	0.2	0.2	0.2	0.3	0.3	2.3
Congo (Brazzaville) .....	0.2	0.2	0.2	0.2	0.3	0.4	0.5	0.5	3.2
Egypt .....	0.9	0.7	0.7	0.6	0.6	0.7	0.7	0.7	0.0
Equatorial Guinea .....	0.0	0.4	0.4	0.5	0.4	0.4	0.4	0.4	0.1
Gabon .....	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	-0.5
Sao Tome and Principe .....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	—
Sudan .....	0.0	0.4	0.4	0.7	0.7	0.7	0.7	0.8	3.4
Other .....	0.3	0.3	0.4	0.4	0.4	0.5	0.5	0.5	2.2
Central and South America .....	2.0	3.6	3.7	4.6	4.7	5.2	5.8	6.6	2.4
Brazil .....	0.7	1.8	1.9	2.9	3.1	3.6	4.0	4.4	3.7
Argentina .....	0.5	0.8	0.8	0.7	0.5	0.4	0.4	0.4	-3.0
Colombia .....	0.5	0.5	0.5	0.5	0.4	0.3	0.3	0.3	-2.8
Peru .....	0.1	0.1	0.1	0.1	0.2	0.2	0.3	0.3	4.4
Trinidad and Tobago .....	0.1	0.2	0.2	0.2	0.2	0.2	0.1	0.1	-0.9
Other .....	0.1	0.2	0.2	0.2	0.4	0.5	0.7	1.0	6.6
Total World .....	65.7	81.9	81.6	85.3	88.3	91.1	92.8	94.5	0.6
OPEC Share of World Production .....	38%	43%	43%	43%	45%	46%	46%	46%	
Persian Gulf Share of World Production ..	25%	29%	29%	28%	29%	30%	30%	30%	

Note: Conventional liquids include crude oil and lease condensate, natural gas plant liquids, and refinery gain.

Sources: History: Energy Information Administration (EIA), Office of Energy Markets and End Use. Projections: EIA, Generate World Oil Balance Model (2008).

## Appendix B

### Crude Oil and Total Petroleum Imports Top 15 Countries

Country	Crude Oil Imports (Top 15 Countries) (Thousand Barrels per Day)			Feb-08	YTD 2008
	Feb-09	Jan-09	YTD 2009		
CANADA	1,913	1,946	1,930	1,920	1,933
MEXICO	1,219	1,299	1,261	1,231	1,214
SAUDI ARABIA	1,135	1,337	1,241	1,614	1,544
VENEZUELA	962	1,172	1,072	945	1,043
ANGOLA	671	527	595	341	458
IRAQ	519	568	545	780	658
NIGERIA	457	488	473	982	1,075
BRAZIL	365	397	382	169	169
KUWAIT	251	225	237	261	249
ECUADOR	243	272	258	169	209
COLOMBIA	225	225	225	220	194
EQUATORIAL GUINEA	167	118	141	69	53
ALGERIA	142	359	256	191	281
RUSSIA	139	157	149	80	47
CHAD	101	79	90	89	103

### Total Imports of Petroleum (Top 15 Countries) (Thousand Barrels per Day)

Country	Feb-09	Jan-09	YTD 2009	Feb-08	YTD 2008
CANADA	2,512	2,544	2,529	2,464	2,527
MEXICO	1,364	1,430	1,399	1,327	1,317
SAUDI ARABIA	1,147	1,362	1,260	1,627	1,563
VENEZUELA	1,139	1,353	1,252	1,131	1,214
ANGOLA	671	543	604	350	468
IRAQ	519	568	545	780	658
NIGERIA	496	509	503	1,025	1,110
RUSSIA	478	516	498	451	421
BRAZIL	381	450	417	172	200
ALGERIA	369	720	553	384	514
VIRGIN ISLANDS	333	367	350	351	366
UNITED KINGDOM	260	147	201	155	185
KUWAIT	251	242	246	266	252
ECUADOR	243	278	261	186	224
COLOMBIA	241	269	256	240	218

**Note:** The data in the tables above exclude oil imports into the U.S. territories.

**Source:** [http://www.eia.doe.gov/pub/oil\\_gas/petroleum/data\\_publications/company\\_level\\_imports/current/import.html](http://www.eia.doe.gov/pub/oil_gas/petroleum/data_publications/company_level_imports/current/import.html) (accessed 26 April 2009).

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